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Ruffled feathers and juicy tidbits

AMD's lawsuit may be revealing, but Rob Jones hopes it doesn't distract the CPU maker too much

rob_jones@vnu.co.uk

Y ou wouldn't necessarily expect us to write about Apple in *PCW*, but it has been an interesting few weeks for a company that has elegantly risen from the dead in the past to re-invent itself several times while still remaining true to its roots.

But after announcing that it is ditching the PowerPC CPU in favour of Intel, the company has been hard to ignore. Both Gordon Laing and Kelvyn Taylor have analysed this decision inside this issue, and predicted how this will shake up the industry and affect Apple. The decision was made as we went to press with our last issue and made our news pages, so regular readers have had the chance to comment on the Letters page (see page 44).

We've even squeezed in a Hands on workshop that shows you how to upgrade the memory and, more importantly, the hard disk in a Mac Mini (see page 176). Not a difficult job, PC users might think, but as Mac aficionado Chris Cain discovered, it's not as straightforward as you would expect.

When Intel and Apple made the announcement, did they expect processor arch-rival AMD to hit back at Intel with a lawsuit? I wouldn't mind betting that they certainly discussed how outraged AMD would be at being locked out of this tidy and potentially very profitable deal, but perhaps they didn't expect anything more than posturing. However, it is widely believed that the thought of 'Intel Inside' Apple machines finally prompted the decision to launch legal action.

AMD has made fantastic strides, making its CPU first choice among many enthusiasts, and the rivalry with Intel is intense. Whenever I meet up with the two companies I notice that neither mentions the other by name. AMD caught Intel out with the Athlon 64, although its presence in the laptop market is still quite poor. It says the Centrino platform restricts the choices people have, because it dictates the CPU, motherboard chipset and wireless chipset that can be used. AMD has released Turion as the mobile CPU that lets people (or more precisely, the system builders) choose the chipset technologies they use. Ask most people, though, and I don't think they care for this choice, they just want simplicity – and that's what you get with Centrino.

I hope this lawsuit doesn't distract AMD too much, as we need an innovative, strong competitor to counter Intel's domination. However, a meaty court case will be great fun for outsiders to watch and, if it drags on, we anticipate lots of juicy revelations about business practices.

As well as having our say on Apple and Intel, *PCW* inside this month (OK, I know that's bad English, but it's my little protest at Intel recently forcing Fotoinside to change its name because it has trademarked the word 'inside' – see page 19) also has the latest on monitors. We've looked at 12, but what really surprised us was the strides TFTs have made over the past year. Many people, when they buy a PC, tend to look at the raw power, graphics, memory and hard disk size, relegating the monitor to a secondary consideration, even though they will look at the screen for hours on end. If you are into gaming, video or photographic editing or plan to use your PC as part of your media centre, the monitor plays a major role in both your enjoyment and the long-term health of your eyes. So it should be an important part of your setup, and we've looked at 12 good 19in monitors, none of which cost more than £365.

Another technology that has made giant steps forward in quality and price erosion is that of digital camcorders. About this time last year, I tried out a £500 digital camera and was disappointed with its performance. The colours were cold and the images grainier than I'd expected. This month we've looked at cameras costing under £350 and, having borrowed one of the best on test to try for myself, I was really impressed by the image quality.

> **'I wouldn't mind betting that Apple and Intel discussed how outraged AMD would be at being locked out of this deal'**

PERSONAL COMPUTER WORLD

vnu labs

Performance testing is an important part of *PCW*'s reviewing process and to obtain our authoritative results we use the UK's best PC testing resource – VNU Labs. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs.

PCW's tests are carried out by VNU Labs, the best PC testing labs in the UK

One of the main reasons people upgrade their PCs is because their old model seems 'too slow'. But how do you tell whether the one you're going to replace it with is any faster? At *PCW* we take PC testing very seriously and we have the UK's best PC testing labs – VNU Labs – on tap to enable us to give you reliable, authoritative performance figures, to help you with your purchasing decisions.

Speed isn't everything, but it's an important part of the buying equation, especially when there are so many possible component combinations out there. As many of our PC group tests are based on price bands, checking the performance is even more important – a PC might have a lot of features, but if the core system is underperforming compared to the rest of the group, you need to know before you commit.

In VNU's UK Labs, which is part of a network of European VNU Labs, our staff have over 20 years of combined testing experience and have tested thousands of hardware products in every category. We know all the perils and pitfalls of practical benchmarking and we contribute to the development of industry standard benchmarks through our full membership of Bapco (**www.bapco.com**), the non-profit benchmark consortium. We are also a media member of the Futuremark Benchmark Development Program (**www.futuremark.com**). Below you'll find short descriptions of the main benchmarks we use for testing PC systems and components.

Sysmark 2004 SE NEW!

Sysmark 2004 SE is the latest version of Bapco's industry-standard system productivity benchmark, designed to reflect 32 and 64bit system performance when running popular application software in real-world scenarios and workloads. This new release, launched in June 2005, adds the ability to run on both 32bit and 64bit Windows XP systems. Scores produced by Sysmark 2004 SE are comparable between 32 and 64bit systems, but are not comparable with previous Sysmark versions.

Sysmark 2004 SE uses 15 full applications, plus anti-virus and compression software, divided into two categories: office productivity and Internet content creation. It runs through predefined scripts that include concurrent running of applications to test multitasking capabilities.

Scores are calculated for each category based on the scores for various sub-tasks. Individual tasks are scored based on 'response time' – the time the system takes to complete a task initiated by the user. Responsiveness to the user is scored more highly than the total time taken to complete a number of tasks. These scores are based on a comparison between the test system and a Bapco reference PC with a 2GHz Pentium 4 processor, an Intel D845GBV-based motherboard, 512MB of DDR266 CL2.5 Ram, a 64MB ATI Radeon 9700 Pro graphics card, an 80GB, 7,200rpm IBM hard drive with a 2MB cache, and formatted with the NTFS file system and Windows XP SP1. A score of 100 indicates the system has a performance equal to the reference PC, 200 indicates twice the performance and so on. We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It is run three times, rebooting between each category.

When testing PCs and notebooks, we first configure them automatically with standard desktop settings. This includes removing all startup programs, automatic updates, desktop wallpaper, screensavers and proprietary system tray utilities. This is done in order to ensure the repeatability of tests.

The applications within each category of Sysmark 2004 SE are as follows:

Office productivity
Adobe Acrobat 5.0.5, Microsoft Access 2002 SP2, Microsoft Excel 2002 SP2, Microsoft Outlook 2002 SP2, Microsoft Powerpoint 2002 SP2, Microsoft Word 2002 SP2, Microsoft Internet Explorer 6 SP1, Scansoft Dragon Naturally Speaking 6 Preferred, McAfee Virus Scan 7, Winzip Computing Winzip 8.1.

Internet content creation
Adobe After Effects 5.5, Adobe Photoshop 7.01, Adobe Premiere 6.5, Discreet 3ds Max, Macromedia Dreamweaver MX, Macromedia Flash MX, Microsoft Windows Media Encoder 9 Series, McAfee Virus Scan 7, Winzip Computing Winzip 8.1.

See **www.bapco.com** for pricing information and full details of testing strategies and methodologies.

3Dmark03
3Dmark03 consists of four tests. The first examines DirectX 7 performance; the following two are DirectX 8 and the final test is DirectX 9.

The result is calculated by taking an average of the frame rates from the first three tests.

PERFORMANCE

Sysmark 2004 SE
200
0   100   200   300

3Dmark03*: Crucial Radeon 9700 Pro
4,698
0   2,500   5,000   7,500   10,000

Far Cry (fps)
60
0   20   40   60   80   100

* Tested at 1,024 x 768 in 32bit colour

The result: a score of 200 indicates that the system is twice as fast as the reference PC

The reference PC (2GHz P4, 512MB of Ram) scores 100

A Radeon 9700 would score in the region of 4,600

The result: a score of 60fps (frames per second) or higher is most desirable

A result of 30fps or above means the machine can produce playable frame rates at the tested resolution

vnu labs

Far Cry is a real challenge for modern graphics cards

PCmark04 measures memory, processor, graphics and hard drive performance

The results from the fourth test are included, but have a lesser bearing on the final score.

This version will only run fully on DirectX 9-compliant cards. 3Dmark03 is suitable for modern cards in the budget to mid-price ranges. For the latest cards, we use 3Dmark05.

3Dmark05

3Dmark05 is a demanding test designed to stress the latest generation of DirectX 9-compliant cards and will only work with models that support Pixel Shaders 2 and have DirectX 9c installed.

Using the same interface as 3Dmark03, the main benchmark consists of three simulated game tests. These are designed to load the graphics subsystem as much as possible, although the CPU and other components can have an effect on the overall score, which is why 128MB of video Ram and a 2GHz CPU are part of the minimum system requirements for running the tests. For systems using older graphics cards that don't meet the 3Dmark05 requirements, we will use 3Dmark03.

Far Cry

We use the Far Cry game from Ubisoft for testing DirectX 9 gaming performance. The default demo we use is timedemo on the 'Fort' level. For PC and notebook testing we test at 1,024 x 768 pixels, 32bit colour, 75Hz refresh and default settings for both anti-aliasing (AA) and anisotropic filtering (AF).

When it comes to testing graphics cards, in addition to the standard test, the card is also tested at 1,024 x 768 with 4x AA and 4x AF; 1,600 x 1,200 with 4x AA and 4x AF and 1,600 x 1,200 with maximum quality settings.

PCmark04

Part-way between application-based and entirely synthetic benchmarks, PCmark04 uses a hybrid technology, employing portions of real applications to produce realistic performance results without the overhead of installing complete software packages.

It has four main suites of tests for measuring memory, processor, graphics and hard drive performance, as well as that of the overall system. For more information on PCmark and 3Dmark, visit **www.futuremark.com**.

Battery test

To get a feeling for the minimum length of time a notebook battery will last, we run a specific test. Based on a looping Excel Visual Basic application, the test opens worksheets, generates random numbers and pivot tables, then zooms, and adjusts the brightness and contrast of an image. The running time is recorded to disk every 30 seconds until the battery power diminishes.

Test beds

When testing components and peripherals, we use several standard Intel and AMD-based test rigs. These are as follows:
• CPUs and memory: 3.4GHz Intel Pentium 4 Extreme Edition, AMD Athlon 64 4000+, AMD Athlon 64 3400+
• Memory: 1GB of Crucial PC5300 DDR2 Ram (Intel) or PC3200 (DDR1-400) (AMD)
• Motherboards: Asus P5AD2-E Premium (Intel); ECS KN-1 (AMD)
• Hard drive: 120GB Western Digital EIDE model with an 8MB buffer
• Graphics card: ATI Radeon X850XT PCI Express
• Operating system: Windows XP SP2
  For hard drive testing, we use a dedicated Intel P4 3.4GHz system with 512MB of Buffalo PC5300 DDR2 Ram, an Nvidia Geforce 6800 PCI Express graphics card and an Intel D925XECV2 motherboard.

3Dmark05 pushes modern graphics cards to their limits

3Dmark03 is used to test DirectX 7/8 graphics cards

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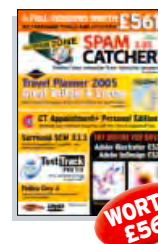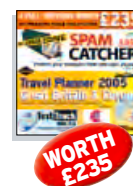
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being developed   **Page 208**

CT Appointment + PE
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Featured software on the DVD

Surround SCM
This change-management utility controls
and records changes to source code   **Page 210**

Other highlights

Build the ultimate PC CD & DVD
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Games demos DVD

News

Contents

All those 'HD ready' displays on sale are not going to make Auntie Beeb announce a launch date for HD TV broadcasts. But the BBC could soon be offering HD content online or 'trickle charged' to PCs and set-top boxes.

Caerphilly court convicts chipper

An unnamed Cambridge graduate has become the first person in the UK to be convicted for chipping a games console.

He was sentenced to 140 hours of community service by magistrates at Caerphilly for selling Xbox consoles fitted with a 200GB hard drive containing 80 games for £380.

Bypassing the copy protection on games consoles has been illegal since 2003, when Britain enacted the EU Copyright Directive.

Chips soldered to a console motherboard can allow the device to run bootleg and foreign games; they can also turn an Xbox, which is sold at a low price to promote games sales, into a cheap PC.

The Caerphilly case was bought by Elspa, which represents Britain's games industry.

Green light for 24Mbit DSL

Broadband links of up to 24Mbits/sec could be available within weeks, following a green light for next-generation ADSL2+ links.

The rollout will be speeded up as a result of 'local loop unbundling' – the opening of BT exchanges to rival service providers.

ADSL2+, which will render many current modems out of date, including those combined with routers, was expected to get regulatory approval shortly after we went to press. But an Ofcom spokesman said that even if there was a delay over details it would be a short one.

ADSL2+ uses a wider bandwidth and more efficient modulation to push more data down phones lines originally designed for voice.

Freedom2surf (F2S) says it will offer the service at 14 exchanges as soon as it gets an expected go-ahead from Ofcom – and that 240 exchanges, serving 50 per cent of the UK population, will be enabled by the end of the year.

That does not mean all these people will be able to get 24Mbits/sec links. The range of ADSL2+ is greater than that of ADSL, but data rates with both technologies drop off with range.

Chris Panayis, managing director of F2S, said users within 1.5km of an exchange can expect speeds of between 10Mbits/sec and 24Mbits/sec. 'But all users should see an increase of speed compared with what they can get with ADSL,' he said.

F2S is reselling bandwidth provided by Easynet equipment installed at BT local exchanges and is one of several service providers likely to be offering ADSL2+.

Panayis could not give a price for the new services because he did not yet know how much Easynet will be charging. But pricing will almost certainly be along the lines of existing F2S services, for which you pay less if you accept a cap on peak-time usage.

F2S has just launched an 8Mbits/sec service with prices starting at £14.99 with a 2GB-a-month cap – though there is no limit on off-peak downloads.

This follows an industry trend towards charging by volume rather than speed, reflecting the way providers themselves are charged and discouraging promiscuous P2P (peer-to-peer) file sharing.

But Panayis says that few users actually exceed the cap with everyday use and for services like video on demand, which become far more viable with the increased speeds, the bandwidth charges may be absorbed into the price of watching the film.

A start-up called Be is also offering a 24Mbits/sec service and you can expect other providers to follow suit.

Clive Akass
www.freedom2surf.net
www.bethere.co.uk

Small comfort for tablet PC market

All the new tablet PCs we have seen this year have been 12in and 14in formats targeted at niche markets such as hospitals and field-force tasks that lend themselves to electronic form filling.

Evidently these markets are demanding big machines, but the Tablet is surely not going to gain mass sales until it is more portable (not to mention cheaper).

Motion could help bring about this change with its LS800 tablet, even though this too is targeted at the same markets.

Motion says it is the most compact available, measuring 22.7 x 17 x 2.2cm and weighing 1kg. And it is based on Intel's latest Sonoma mobile platform, powered by a
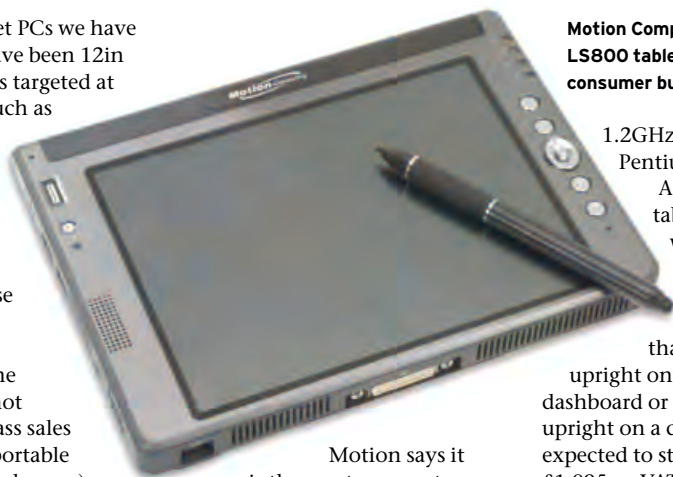
Motion Computing's compact LS800 tablet could attract consumer buyers

1.2GHz ultra-low-voltage Pentium M processor. As with all Motion tablets, there is a wide choice of peripherals, including a neat docking station that can hook upright onto a wall or car dashboard or seat the LS800 upright on a desk. Prices are expected to start from around £1,095 ex VAT.

Watch out for a full review soon in *PCW*.
www.motion.co.uk
● Motion LE1600 review on p60.

>> **Keep up to date with the news, reviews and competitions in our weekly newsletter. To subscribe go to www.vnuservices.co.uk/pcw**

>> **19in screen test**
See page 97 for reviews of a bevy of large TFT monitors

AMD lists Intel 'dirty tricks'

AMD has launched an anti-trust suit against Intel claiming that it used cash, rebates, 'marketing funds' and other sweeteners to induce major system builders into using only or mostly Intel chips. Allegations include:

● Dell, as a result of 'outright payments and favourable pricing', has not purchased a single AMD x86 processor despite acknowledging that there is a demand for them.

● Intel, in a bid to reduce AMD's 22 per cent share of the Japanese market in 2003, 'paid Sony multi-million dollar sums, disguised as discounts and promotional support.' Sony then cancelled plans to release Athlon systems.

● Toshiba, once a significant customer, dropped AMD products after a substantial payment from Intel in 2001.

● HP demanded $25m a quarter in 2002 to compensate for Intel retaliation if it used AMD processors in its commercial PCs.

AMD says the dispute goes back to the birth of the PC, when IBM awarded Intel the contract for the processor on condition that it allowed a second company to make x86 CPUs to avoid a monopoly source.

'AMD agreed to abandon its own, competing architecture, and undertook to manufacture x86 chips as a second source of supply,' the complaint says.

A 1995 settlement of claims regarding Intel's restrictive practices allowed AMD to use the x86 instruction set if it developed its own architecture to run the code. AMD said this forced the company to reinvent itself. It says it has since leap-frogged Intel technologically on several occasions, notably with the Athlon in 1999 and 64bit chips in 2003.

Its complaint reads: 'AMD's market share has not kept pace with its technical leadership... Intel has unlawfully maintained the monopoly IBM bestowed upon it.'

The anti-trust case is likely to rest on the distinction between aggressive legitimate practices and monopoly abuse.

Intel chief executive Paul Otellini said Intel had won similar cases in the past and would win again. He added: 'Intel has always respected the laws of the countries in which we operate. We compete aggressively and fairly.'

Microsoft finally settles with IBM

Microsoft is to pay IBM $775m (£440m) to settle the bitter decade-long anti-trust battle stemming from a case in which IBM was identified as having been 'impacted in its business by certain Microsoft practices'. The settlement also resolves all anti-trust claims relating to the IBM OS/2 operating system, famously dumped by Microsoft, and the Lotus-developed Smartsuite office suite.

Soft focus

Fujifilm went a bit soft in the head when it tried to take a new angle on the camera stand. It came up with this £9.99 cushion, designed to provide an easy-to-carry way to hold a camera still for low-light and self-timer shots. F10 in deep water – see page 21.

Inside out as Intel forces name change

Intel has threatened court action to protect what it sees as its interests. Lawyers acting for the company 'requested' that UK firm Fotoinside to change its name, because it could be confused with the 'Intel inside' slogan.

The Cambridge company is now called Fotoinsight.

MD Klaas Brumann said the idea that the name might be associated with 'an American duopolist' had never crossed his mind. But he changed the name rather than face the hassle of fighting Intel's claim across the 21 jurisdictions of Europe.

Lucky projector up against the wall

Only the 'filthy rich' used to be able to afford digital projectors but now they are within the reach of nearly everyone, according to Lucky Goldstar. Its first entry into the market, the AN110 (pictured), costs £1,999, which may say something about what LG regards as affordable.

It is a very stylish machine, though. An L-shaped prism-and-lens system turns the beam through 90º, allowing the projector to be much thinner than usual. It is designed to be mounted on a wall or it can be used standalone like a normal projector. A motorised zoom and focus, with a vertical lens shift, allows the device to be used in tight spaces.

The stylish AN110 can be wall mounted or used standalone

Another fine Mesh

Mesh Computers has stepped in and supplied a *PCW* reader with a PC after his original prize, a Carrera PC, failed to materialise when the company went into liquidation in January. John Holbrook won his PC after he took part in our reader awards, but despite our best efforts we were unable to supply it to him.

We turned to Mesh and asked if it could help out, and it has supplied a direct replacement, giving our reader an AMD Athlon 64 3000+ Matrix Inspire PC.

Mr Holbrook said: 'I was pleasantly surprised that Mesh had stepped into the breach, providing a 64bit machine at such short notice and with absolutely no fuss at all.'

Lots of slots on photoprinters

HP has released four new portable photo printers. The £149.99 inc VAT Photosmart 335 (above) weighs 1.4kg and has five slots for direct printing from all major memory cards. A USB port connects to any Pictbridge-enabled camera and to most USB flash drives,

The £199 inc VAT Photosmart 385 has a 6.4cm screen for selecting photos. It can print directly from a camera via a Bluetooth link.

No prices were released for the Photosmart 475, which can store up to 1,000 photos that can be viewed on a TV or burned to a disc without using a PC.

The Photosmart 422 Portable Photo Studio has a 5.2megapixel camera, docking station and printer. All products will be available in August.

USR maxes out on Wifi range

US Robotics claims its MaxG Wifi products can reach 50 per cent further than standard 802.11g devices, and are rated 150 per cent faster at 125Mbits/sec.

This speed boost can only be achieved when used with other MaxG products, but USR says the technology boosts the effect range even when working with products from other vendors as the improvement stems from improving receiver sensitivity.

Blue moving

Evesham's £329.99 inc VAT Bluemedia BM6300 satellite navigation kit uses a customised version of Destinator software, and has a 256MB memory card with maps of the UK and Ireland and an option for full European maps. It can also warn you when you are breaking the speed limit. **www.evesham.com**

NEC adopts JIT system

Japanese giant NEC is taking on Dell in the UK market by using a similar system of just-in-time (JIT) manufacture at its plants in Scotland and France, and build-to-order offerings at its website.

Dell became a world-leading PC builder using its JIT system, the main feature of which is to avoid waste by just stocking components as they are needed.

NEC differs in that it will continue to sell through dealers, and its online sales are targeted at, if not restricted to, businesses of all sizes. Most of its UK consumer PC sales are under the Packard Bell brand through Dixons and PC World.

The company splits its commercial range between its I-select products, using the latest technologies, and its Powermate PCs and Versa notebooks aimed at providing a stable platform for big organisations that do not want to keep changing configurations.

However, this corporate conservatism did not stop NEC from including the Versa C250, based on AMD's latest 64bit Turion mobile processor, in its new commercial range. The Versa C250, the Celeron-based M350 and the Centrino-based
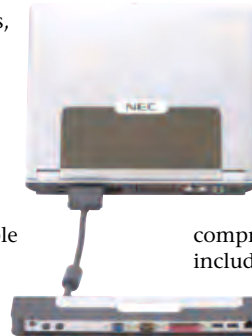
NEC's Versa C250: part of the new commercial range

P550 all offer fingerprint authentication, Trusted Platform Module security and theft tracking. They also offer comprehensive connectivity including Wifi, USB2, Bluetooth, infra-red and Firewire.

A fourth model, the Versa S940, is a thin-and-light Centrino aimed at people on the move.

NEC has standardised on a one-size-fits-all port replicator to avoid confusion in companies with a range of models. **www.nec-online.co.uk**

Turion scores among corporates

AMD's new 64bit Turion processor for mobiles appears to have broken Intel's hold on the corporate notebook market. HP unveiled a range of notebooks that incorporate the mobile 64bit processor.

The chip is included in the company's Pavilion ze2000 series, Compaq Presario M2000 and V2000 series. The

The HP Pavilion includes a mobile 64bit processor

models are among HP's entry-level devices and previously featured the AMD Sempron mobile processor.

But better news for AMD, according to analysts, is the fact that the chip will go into a new business range of Compaq computers to be sold globally.

Acer and NEC (see above) are also offering Turion notebook options.

Users of the HP offerings will not benefit much from the 64bit chip as they have a 32bit version of Windows XP. Microsoft started shipping a 64bit version, in April but it is short on drivers. However, 32bit applications can run faster on the 64bit chip as it has more registers.

New launches recall first Tosh laptop

Back in 1984, Toshiba launched a PC called the T1100. It had a 4.77MHz 80C88 processor, the MS-Dos 2.2 operating system, a 720KB floppy drive and a 640 x 200 4.7in display, and it weighed 4kg, which Toshiba proudly called portable.

Toshiba claims it was the first mass-market notebook and has been celebrating its 20th birthday – which is odd, as 2005 is its 21st. But this year also happens to be the 130th anniversary of the founding of a company

that came to be called Shibaura Engineering, which in 1939 merged with Tokyo Electric and was renamed Toshiba in 1984.

The company has launched a new range of notebooks to celebrate, including the tiny Libretto U100 which is 75 per cent lighter than the old T1100.

Other new lightweight models include the Portégé R200, S100 (pictured left) and the ultraportable M300. There are also three new Satellites (the M40, M50 and M60) and the Tecra M4 Tablet PC.

F10 in deep water

Fujifilm has launched a waterproof casing for its high-sensitivity F10 Zoom camera enabling it to take pictures at a depth of 40m.

The F10's 6.3megapixel sensor is rated at ISO 1,600, which is four times the speed of non-professional 'fast' colour film and so better able to take pictures in the depths. It also refreshes at twice the speed of the older F810 digicam.

As a result of this speed, it can take pictures in natural light under conditions that would normally require flash. It allows allows the use of faster shutter speeds, reducing the risk of camera shake.

Fujifilm's F10 can take underwater shots at a depth of up to 40m

Fujifilm's Jenny Hodge says the success of the F10 shows people are beginning to look for more in a digicam than simply a high pixel count.

The F10, which is said to have a 500-shot battery life, costs £299.99 inc VAT and the waterproof casing is £149.99.

Fox takes dive

The Che-ez Fox 4 camera pictured below can also take pictures underwater, but only to a depth of 3m. It is, however, inexpensive at £69.95 inc VAT for a 3megapixel slimline camera with an SD slot and 16MB of inbuilt memory. It can even take 12fps movies. A 2megapixel version, the Fox 2, costs £59.95.

The two products are being imported into the UK by a Japan-based company called NHJ, which develops consumer electronics products under brands like Che-ez, D'Zign, and Vamp.

Among a range of products it was showing off last month was the £129 inc VAT watch TV, pictured left.

Japan-based company NHJ has a range of new products including the Che-ez Fox 4 camera and watch TV

U3 makes anywhere home

Walking programs could usher in a new way for office and mobile workers to use computers, major USB-drive manufacturers believe. The idea is to install your favourite programs, complete with configurations, onto a flash drive so you can literally plug your personal workspace into any computer.

Flash-drive specialists Sandisk and M-Systems set up a company called U3 last year to develop the technology and promote it as a standard. The drives can be made by any manufacturer but they will all carry the U3 logo.

Like many simple ideas in IT, U3 technology is tricky to implement and has ramifications beyond the immediately obvious. Most leading software is now sold with product activation – the code is locked for use on a single machine or at most one desktop PC and a notebook.

A U3-enabled drive would let you use a single version of Adobe's Photoshop, for instance, on any number of machines. The advantage to the user is obvious but some software vendors may fear that, although U3 helps answer complaints about the inflexibility of product activation, it might cut sales by reducing the need for multiple copies.

And the co-operation of software developers is vital because U3 requires a special editions of their products to get round the fact that Windows expects configuration data to be in the host system's Registry. Applications also commonly scatter their files all over a system.

U3 zips up an application on the USB drive and unpacks the configuration data and code it needs into system memory. A window on the host system provides access to the U3 applications.

Significantly, perhaps, early supporters of the system include anti-virus and security specialists McAfee and Zone Labs.

A U3 drive can be protected by passwords or biometrics and could contain encrypted automatic log-on procedures for company or banking sites, bypassing any rogue code logging keypresses on the host system. But many organisations do not like USB drives being plugged into their systems at all, let alone products running code that could be up to all kinds of deliberate or accidental mischief.

However, new dual-core processors are bringing in virtualisation technology that compartmentalises a PC into what are effectively separate computers, allowing U3 apps to run in 'quarantine'.

U3 chief executive Kate Purmal admits the technology will need to gain critical market mass to get full developer support. She says Microsoft is looking at the technology for some applications but currently not for Office.

However there is already a third-party U3 application that can pick up Outlook email. And Purmal said: 'Office products like Word are going to be on just about every PC you use so you don't need to carry them about. You can just carry your files… your Word documents, say.'

She said there had been an overwhelming response at a recent developers' meeting. The 32-plus companies already backing U3 include Corel, Mozilla and Cyberlink, Kingston, Checkpoint, Trend Micro, Zone Labs, McAfee, Ulead and Skype. Significantly, perhaps, they include several security company sensing a possible new line of business.

There is no reason in principle that the U3 technology should not be used on portable hard drives, but Purmal quotes a Gartner estimate that within five years the average USB drive will store 16GB.   **CA**
www.u3.com

>> **Photopack**
UK developer Serif has launched Photoplus 10 Studio Pack, a £59.99 bundle of Albumplus, an album program and the latest version 10 of its Photoplus image editor

New features in Photoplus include 200 macro presets for performing a series of tasks with a single click. You can also record macros and process batches of images.
www.serif.com

>> **Lasting memory**
A new Bonusprint service allows you to order prints of digital images on Kodak Supra Endura Lustre paper that is said to preserve images for more than 100 years. Prices start at 25p per print.
www.bonusprint.co.uk

>> **Phone Notes**
Users of Symbian-based smartphones using the UIQ user interface, such as Sony Ericsson's P900 and P910, can now access their Lotus Notes email and other data using Commontime's MNotes for Symbian utility. It costs £42 ex VAT, including maintenance and support for one year.
www.commontime.com

>> **What a Cad!**
'Thresholding' technology in Scan2cad 7.3, the latest version of the utility for translating paper-based technical drawings into editable dxf vector files, sharpens the scanned image to improve quality. The regular edition costs £149 ex VAT and the Professional is £249.
www.softcover.com

Double vision takes USB a long way

UK-based Scene Double is offering a range of extenders that allow you to site monitors and USB2 peripherals up to 50m from a host PC using standard Ethernet cable. USB links are normally limited to 5m. The box pictured below provides two display channels, a four-port USB hub, a duplex serial link and a bidirectional stereo audio link.

The twin display channels require two cable links but only one is needed on more limited models. Prices start at £345 ex VAT.
www.scene-double.co.uk

Cmos radio packed into processors

Intel has developed a prototype of a single-package radio transceiver supporting all Wifi modes, including emerging 11n, and capable of being made by Cmos manufacturing processes.

Information released didn't make it clear whether the device was a single chip or a package with passive tuning circuits. But Intel says it goes some way towards having a single device that can tune into any radio network.

All-digital tuning requires massive processing, increasing power drain. But Krishnamurthy Soumyanath, director of Intel's Communications Circuits Research Lab, said the new package operates at just 1.4v 'and uses more low-voltage circuitry than we've ever used in the past... providing longer battery life.'

He said the modules could support data rates in excess of 100Mbits/sec, enough for multiple high-quality video streams.

Future 'smart' aerials could make systems using the device more power efficient. Its use of Cmos technology not only means it can be mass produced at low cost, but also that the radio can be integrated into larger processors, Soumyanath said, after presenting a paper to a Very Large Scale Integration (VLSI) symposium in Japan.

Motorola buys Sendo assets

Motorola has acquired the development team and patents of mobile maker Sendo, which has gone into administration.

A notice on the company's website says Simon Appell and Alastair Beveridge, of Kroll's Ltd, have been appointed as the firm's administrators.

Details of the Motorola deal have not been disclosed. Sendo, founded in 1999 by Hugh Brogan, sold around five million handsets last year achieving $420m in revenues, according to a statement by Motorola.

Sendo settled a two-year legal dispute with Microsoft last year after dropping a Windows-powered phone and accusing the company of stealing its technology. Sendo got an undisclosed sum from the deal.

Celeron D goes 64bit

Intel unveiled a new range of budget 64bit Celeron D processors last month as rival AMD launched a new Athlon64 FX-57 chip aimed at gamers.

The Mesh FX-57-based system, reviewed on page 55, shows the chip to be a good choice for single-core gaming though its performance in office application is less compelling.

Intel's new chips come with a confusion of names. The 'D' on Pentium D processors stands for dual-core; but Celeron D chips are single core, so the 'D' can be taken to stand for 'don't know' on the grounds that no-one understands the naming system, including Intel.

CELERON D 3XX	CLOCK GHZ	64BIT	EXECUTE DISABLE	SOCKET
351	3.2	✔	✔	LGA775
350	3.2	✗	✗	mPGA478
346	3.06	✔	✔	LGA775
345J	3.06	✗	✔	LGA775
345	3.06	✗	✗	mPGA478
341	2.93	✔	✔	LGA775
340J	2.93	✗	✔	LGA775
340	2.93	✗	✗	mPGA478
336	2.8	✔	✔	LGA775
335J	2.8	✗	✔	LGA775
335	2.8	✗	✗	mPGA478
331	2.66	✔	✔	LGA775
330J	2.66	✗	✔	LGA775
330	2.66	✗	✗	mPGA478
326	2.53	✔	✔	LGA775
325J	2.53	✗	✔	LGA775
325	2.53	✗	✗	mPGA478
320	2.4	✗	✗	mPGA478

To provide some clarification, the chart above shows all the 300 series Celeron D-chips. New 64bit products are the 351, 346, 341, 336, 331 and the 326; the non-64bit 350 is also new.

The entire series has a Prescott core, a 533MHz frontside bus, and 256KB of cache; and none of the mPGA products supports 64bit addressing or 'execute disable', which provides hardware protection from rogue code trying to exploit buffer overruns.

The new chips are all made using 90nm process technology; and, with bulk prices ranging from about £40 to £70, they should enable the production of powerful desktop PCs at budget prices.

Freescale gets in first with UWB

Intel is facing competition in Ultra wideband (UWB), a short-range fast radio technology it has been heavily promoting.

Freescale Semiconductor, the former chipmaking arm of Motorola, has developed a chipset for high-definition TV signals to be sent from a set-top box to a TV without wires.

The company has teamed up with Chinese manufacturer Haier to use the technology in a 37in LCD TV paired with a digital media server that can be placed up to about 60ft away. Freescale's version of UWB can transfer data at 110Mbits/sec over distances of up to 65ft, the company says.

Attempts at agreeing a UWB standard foundered when the industry split into two camps. Intel has been promoting one version as part of the Wimedia Alliance.

It has the widest industry support but Freescale is regarded as being ahead in its development.

However the Intel-backed system is faster. Prototype 'wireless USB2' systems, using UWB instead of a physical link, have swapped data at up to 480Mbits/sec.

TV dish provides satellite web access

The German company Teles has launched its Sky-DSL satellite web access service in Britain with prices starting at £6.99 for a 1Mbit link. There will be no start-up fee for an introductory period.

Satellite access has never really taken off in Britain but as Teles covers much of Europe it is likely to be more financially viable.

Tele's Sky-DSL service is unidirectional: you use a dial-up connection for outgoing traffic but downloads are by satellite. The entry-level service charges €0.015 per MB, which would be prohibitively expensive for heavy users; other Sky-DSL tariffs give you 1GB 'free' for £16.90 a month or unlimited downloads for £29.90.

Teles says Sky TV dish aerials can be used with only a slight modification. www.teles-skydsl.co.uk

Satellite web access could soon be a hit in the UK thanks to services such as Teles

Big is best for HDTV displays

It is not worth paying a premium for high-definition screens measuring less than 27in diagonal, according to tests performed at the BBC R&D Labs.

'There is little point in putting HDTV on a 14in portable; unless you sit very close to it, you won't see the advantage,' says a briefing paper from researchers that will be music to the ears of display vendors.

The flip side is that standard TV quality 'runs out of steam' on widescreen displays with a diagonal of 27in or more, the BBC's R&D annual report says.

There have been complaints that many displays being sold as 'HD ready' are not so. To qualify for the HD Ready logo (see below) they must support formats of 1,920 x 1,080 interlaced (alternate lines rendered on successive sweeps) and 1,280 x 720 progressive (non-interlaced) at 50Hz or 60Hz.

Many programme makers want to shoot at 1,920 x 1,080 progressive at 25Hz, which is considered to be near-film quality. The BBC would prefer to double this frame rate for production quality, but programmes are likely to be broadcast at lower quality.

BskyB's HDTV system supports both the 720p and 1,080i formats.

Video codec

Dirac, the BBC's open-source compression technology aimed at providing a royalty-free way to deliver video, now supports Windows Media Player.

It can now decode and play a 1Mbit/sec video stream on a standard PC at 'near broadcast quality' but the software has yet to be fully optimised.

The code can be downloaded at **http://dirac.sourceforge.net**.

BBC trickle-charges HDTV

The BBC plans to make high-definition TV programmes available for download well before it begins HD broadcasts, which will not be until 2008 at the earliest.

The idea is to 'trickle charge' personal-video-recorders, advanced set-top boxes or TV-enabled computers with HD content by broadcasting at night or in spare daytime slots. Programmes may also be delivered over broadband links, according to researchers at the BBC R&D labs at Kingswood Warren, near Gatwick airport.

The BBC's annual R&D review says people may be able to view this HD content at a time of their choosing. Alternatively 'a flag sent at the time of the scheduled broadcast would cause the set-top box [or other device] to automatically switch to replay the HD version downloaded earlier.'

BSkyB plans to broadcast HDTV by satellite as soon as next year, but the BBC has to wait

Toshiba's 37in 37WL56 widescreen TV is one of a number of HD-ready models already on sale. Like most of them, it can take input from a PC

until spectrum is freed up by the phasing out of analogue broadcasts (see below). However the BBC is already making major programmes in HD, with an eye to the world market, and plans to upgrade most of its production by 2010.

Complete shut-off of analogue BBC channels is not expected until 2012. It will provide airspace for a far greater number of digital channels, which are not so bandwidth hungry. But the gain is offset to an extent by the greater bandwidth required by real-time HD broadcasts.

Early estimates that an HD channel would require 20Mbits/sec are now regarded as pessimistic, the R&D review says. A demonstration last year using mpeg2 compression required 17Mbits/sec but with new compression techniques this could be reduced to 8-12Mbits/sec.

The BBC is currently testing ways to use a larger version of the multiple in multiple out (Mimo) aerial systems that are used to increase the range of the latest wireless routers.

Mimo can also increase the capacity of a system and researchers are investigating whether the technology could be used to deliver HDTV within the 8MHz channels used for standard digital TV broadcasts.

Scramble for switchover spectrum

A global scramble has begun for the use of spectrum released by the shift from analogue to digital broadcasting – and it doesn't just involve broadcasters.

Operators planning Wimax and other interactive services would love the use of some of the lower frequencies which are good at penetrating buildings and are therefore suitable for wide-area wireless links in cities.

The spectrum below 30MHz – covering short, medium and long wavebands – is good for long-range propagation for national and international broadcasts. The BBC World Service and Radio Luxembourg are among several broadcasters testing Digital Radio Mondiale (DRM) services in these bands.

UK-based Radioscape has just released a module, using technology developed at the Kingswood Warren labs and licensed from the BBC, that supports both DRM and high-frequency Digital Audio Broadcasting (DAB). Both technologies can support multimedia as well as pure audio broadcasts – DRM has been suggested as a low-cost way to distribute education materials in places like Africa.

It could also consign to history the stereotype of the World Service listener in some foetid jungle outpost struggling to hear the faint, fading sound of London Calling through a haze of short-wave static. DRM could deliver near-FM quality to many far-flung places using

existing AM transmitters. The power of UK DAB transmitters is currently held low so as not to interfere with analogue stations with which they share bandwidth. This power will be boosted following the switchover, improving DAB coverage.

Another technology in search of spectrum is DVB-H, a mobile version of the signal used to transmit digital terrestrial television. Like DAB, it can be used to transmit multimedia to mobiles.

The fiendishly complex business of spectrum allocation is made even more complicated by the fact that radio waves do not respect national boundaries, so that international agreements are needed.

Mains data 'threat to planes'

Data-over-the-mains systems that promise home networks operating at up to 200Mbits/sec using standard household wiring could present a major threat to aircraft communications, according to a BBC expert.

There may be a way to avoid them interfering with public and amateur radio reception (see below) at ground level – but current technologies do not appear to use it, says Jonathan Stott, who has written a number of papers on the subject for the BBC's R&D Labs.

XDSL links, which, like Power Line Communication (PLC), send a high-frequency signal over lines designed for low frequencies, offer some protection against interference.

But mains wiring behaves exactly like a transmitting aerial (see box below) and is not a good choice for passing data, though of course it scores top marks for convenience.

The 14Mbits/sec systems currently sold in Britain, which use the Homeplug specification, avoid frequencies used by radio amateurs but can interfere with other broadcasts.

New technologies about to hit the market offer speeds of up to 200Mbits/sec; Panasonic has talked of installing its PLC technology into all its home devices, so they can be networked simply by plugging

Homeplug adapters, like these from Packard Bell, turn your mains socket into an Ethernet port

them into the mains. Britain's Ofcom watchdog says devices sold here have to conform to the European EMC directive that says interference must 'allow radio equipment to operate as intended'. A spokesman said: 'Anyone who sells devices that do cause interference knows that we would soon put a stop to their activities.'

But Stott says the directive, and proposals for governing DSL and PLC interference, do not go far enough. Individual installations, might pass EMC tests but he has fears about the cumulative effect of hundreds or even thousands of installations. 'It's not so much interference on the ground because there are buildings in the way to block it. But there is nothing to stop interference reaching aircraft.'

Aircraft cannot escape by gaining height because though the interference from any one source gets weaker, more of them become visible. Many of the frequencies used by aircraft are in the sub-30MHz range used by PLC systems. **CA**

Homeplug flies without wires

Tests have shown that Homeplug data-over-the-mains links are as much wireless as wired. A German researcher found that both the data connection and the interference it caused continued even after he pulled the plug out. This is because the unplugged wire was acting as a transmitting aerial and the far end as a receiver. The BBC's Jonathan Stott, who duplicated the effect, said this might be the case even with the wire plugged in. 'The wire is not designed to do what it is called upon to do and there will be a lot of attenuation of the signal passing along it. I suspect that in some circumstances the data is being transmitted more by the RF than by the wire.'

Adaptive 'notching' could ease problems

Data-over-mains vendors get round many complaints by 'notching out' (ie not using) frequencies that are likely to cause problems. But this doesn't take into account the fact that problem frequencies vary in different areas – and even at different times, because signal propagation is affected by factors such as the weather.

The BBC's Jonathan Stott says there is a possible solution. 'If the system could sense what frequencies are being received on the line being used it could avoid them,' he said. The 11a version of Wifi does something

DS2 adapters shown at Cebit this year delivering two 25Mbits/sec HD TV programmes and four standard programmes over a 200Mbits/sec mains link

similar by avoiding channels that are transmitting in its area.

Kit Aritaka, head of the team developing Panasonic's system, said it supported 'flexible notching' of chosen frequencies under the control of a PC or network link. However this does not appear to be the same as the dynamic system proposed by Stott. Aritaka said his system

will be available by Christmas. The Homeplug organisation did not reply to questions about its 200Mbits/sec next-generation system. But DS2 (see picture above) said its system can sense and avoid frequencies in use on the line.

Adaptive notching would have no impact on aircraft reception.

11a products on sale at last

Linksys, one of the leading Wifi vendors, has begun selling 802.11a Wifi products into Britain for the first time in a move that may signal a general move to the technology.

Most Wifi routers and client cards support only 11g and 11b, which both use the crowded 2.4GHz band. But the latest Sonoma notebooks have optional support for all three modes.

Vendors have tended to talk down 11a because it has a lower range than 11b and 11g; also tri-mode products are more expensive because they need two radio modules – 11a operates in 5GHz bands.

The shorter range of 11a, which is rated at the same 55Mbits/sec speed as 11g, can be seen as an advantage in terms of privacy, security and user density. It remains to be seen whether new Mimo aerials (see BBC story, page 38) will increase the range.

But 11a has other advantages. It offers more channels in less crowded bands and unlike 11g, it is not slowed down by the presence of 11b clients.

Moreover, tri-mode products effectively offer two network links in one. You can use 11g and 11b for less time-critical tasks and 11a to pass multimedia.

Mike Wagner, director of marketing, said the rollout of 11a was delayed partly because of the difficulty of getting Europe-wide acceptance and partly because the original design used chips from two companies. 'We were waiting for a less expensive design,' he said.

But tri-mode products will still be more expensive than dual.

Proxim sold

Wifi pioneer Proxim filed for Chapter 11 bankruptcy protection last month. Proxim was innovative but concentrated on the upper end of the market, offering extra features for corporates. It could not compete when mass-market vendors migrated many of these features to low-cost products.

Proxim has sold its assets to wireless vendor Moseley for $21m (£12m approx) and will continue as a subsidiary.

Fujitsu takes your name in vein

Palm reading is the latest way to authenticate users – but forget all that stuff about lifelines and other mumbojumbo. Fujitsu's palm scanner (pictured right) reads the veins in your hand, which are said to be even more distinctive than fingerprints.

Authentication devices such as this can do more than simply police network logons. The little fingerprint reader (pictured above left) allows you to direct the output of a shared office scanner to your personal folder literally at the touch of a finger.

The devices were on show last month at the opening of a new Fujitsu collaboration

Palm reading (above) is the next big thing. Fingerprint readers (left) and desktop scanners (right) still have a role

centre near Heathrow. The centre is designed to allow customers, developers and vendors to see and test the company's range of scanners and document-management systems.

The centre illustrates how the idea of the paperless office has

finally passed from hype to joke. Even small offices get enough paper-based correspondence to require sophisticated document management if they wish to digitise it all for storage, filing and searching.

Fujitsu's entry-level system centres around the Scansnap ll

colour desktop scanner reviewed last month (*PCW* August, page 60). It costs £360 inc VAT, which sounds a lot until you realise it is bundled with Acrobat 7 Standard edition that itself lists at £295 inc VAT, as well Abbyy Finereader OCR (optical character recognition) software and basic document management software.

Higher-level Fujitsu systems are usually sold by resellers which tailor them to the needs of customers. There are also small specialist scanners, such as the fi-60f, which is designed to scan the likes of driving licences, ID cards and passports. It can work with the lid off, with no blinding light, and automatically de-skews the image and crops it to size. **www.fel.fujitsu.com**

Dodgy circuits rule OK

Experts have welcomed a claimed breakthrough in the design and manufacture of computing circuits – because the products are 'unreliable'.

Researchers at HP say the company can deliver near-perfect manufacturing yields with equipment a thousand times cheaper than that in current use. The products are likely to contain defects, but will be able to configure themselves to bypass these.

The method is a refinement of HP's patented crossbar technology in which two sets of parallel nano-wires sandwich a layer of electrically switchable material. The upper and lower sets are aligned at right-angles to form a matrix in which each node can be switched on or off and the whole can be configured to perform logic.

The simple structure facilitates manufacture at the nano scale, at which it can be hard to produce complex constructions due to alignment problems. The breakthrough involves producing 50 per cent extra wiring to allow for defects, and to apply coding theory already used in some mathematical, cryptographic and telecoms applications.

Stan Williams, one of the research team, said the one disadvantage of the crossbar structure is that it requires more space on the silicon substrate. 'We think the trade-off of space versus manufacturing ease will become more of an issue in the near future,' said Williams.

He added that the group has already produced 30nanometre-scale crossbar chips, about a third the feature-size of today's processors.

Using defect tolerance to replace the need to produce 'perfect' chips could provide a huge cost advantage for manufacturers in the future.

The development was welcomed by Gartner analyst Martin Reynolds as a trend towards what his company called 'unreliable computing'.

He explained: 'This seemingly paradoxical term refers to the ability to assemble devices that do not always function correctly into entirely reliable systems through redundancy and self-correcting designs. This philosophy will extend from the smallest devices to the largest systems.'

HP's approach could produce 10 or even 100 times as many devices as methods aiming for defect-free products. Yet despite the need to bypass defects, the overall system will be 'dramatically more capable' than conventional products.

Gartner says the 'unreliable' or fault-tolerant approach can also be applied to large systems and will become pervasive in IT during the next decade. It cites, as an example, how Google uses low-cost components to deliver reliable global services at one-tenth the cost of a typical server infrastructure.

Smart factories use language

Computers controlling manufacturing processes will be able to reason and understand human commands better thanks to a new 'process specification' language, memorably entitled ISO 18629, the developers say.

It uses artificial intelligence and language analysis to analyse commands in the context of a manufacturing plan. 'Computers using software with this expanded – though still primitive – AI capacity can act on a word's "meaning" and interpret a command almost like a person,' according to a statement from the US National Institute of Standards and Technology, which developed the language with France, Germany, Japan and the UK.

The International Organisation for Standardisation (ISO) has approved six sections of ISO 18629 and is expected to approve the final three.

Organic chips set to increase speed

Researchers have found a way round one of the big snags of organic transistors: the fact that they can't be used in fast logic because they resist the flow of electrons.

It turns out that the problem is caused by interaction between the plastic semiconductor and insulators, typically silicon dioxide, used in the transistor. Alternative insulators do allow electron flow, according to the researchers at the universities of Singapore and Cambridge.

The discovery could lead to the widespread use of cheap plastic electronic devices, which can literally be printed using special inkjets.

First holo movie may usher in 3D TV

US researchers have developed what they claim is the first truly three-dimensional holographic movie, using a digital light projector (DLP) chip similar to that used in most of the latest projectors. The breakthrough means that 3D TV could be available in homes within 15 years, according to one of the research team at the University of Texas Southwestern Medical Center in Dallas.

The technique is similar to that used for producing holographic 3D still images. A beam of coherent (same phase, same frequency) light is split into two: one beam illuminates the object to be photographed and is then focused, together with the second beam, onto the light-sensitive surface. The two beams are slightly out of phase, producing an interference pattern.

The 3D image is created by scanning this pattern with a coherent laser beams. Using a DLP chip instead of a photo-

They may not look as good as *Star Wars* but these clips, from what is claimed to be the first holographic 3D movie, could be a pointer to the future

graphic plate means a rapid succession of images can be used, creating a movie.

In the experimental system the image was projected onto agarose gel, and appeared to be suspended. Another possibility is to beam it onto a stack of liquid-crystal plates similar to those used in PC displays.

Leader of the research team Harold 'Skip' Garner, professor of biochemistry and internal medicine, said applications could include 3D multiplayer games or theme park displays, as well as holographic TV.

Holographic visualisation could also improve diagnosis of swollen, damaged or malformed hearts, Garner explained.

He added: 'An important next step is to take our proof of principle technology that we have now and move it into a commercial entity.'

Armed Java

A new version of Jazelle, from UK chip designer ARM could reduce the memory needs of Java applets on mobiles and boost their performance. The Jazelle Runtime Compiler Target (RCT) architecture will help answer a growing demand for battery-friendly mobiles capable of running sophisticated Java apps at an acceptable speed.

Nvidia parry in dual duel

N vidia says the Geforce 7800GTX graphics processor is as fast as two Geforce 6800 Ultras strapped together with its Scalable Link Interface (SLI) system.

Our tests show a more mixed picture, as Rory Reid reports in his review on page 73. But the 7800GTX is certainly very fast.

It has a core clock speed of 430MHz and 1,200MHz for GDDR-3 memory. These rates are only 5MHz and 100MHz faster than the respective speeds on the predecessor 6800 series.

But UK Nvidia spokesman Adam Foat said: 'There was no point in just increasing the core clock speed or putting in more pipes – that gives you a card that runs very hot, but not that much faster.' He said Nvidia had made the card more efficient, with each pipe getting a 50 per cent performance increase over those in the Geforce 6800 Ultra.

He added: 'It uses less power so runs cooler and allows the fan to be virtually silent, but with a dramatic increase in performance.'

Aopen's Aeolus (left) joins new Gigabyte (see page 73) and Biostar cards using the 7800GTX graphics processor

The 7800GTX has 24 pipes, eight vertex shaders, 300 million transistors and supports SLI on a compatible motherboard with two PCI Express slots.

The launch came only weeks after ATI release, its Crossfire technology, which also allows two graphics cards to be run in parallel. ATI claims an advantage as a Crossfire card can be paired with any Radeon X850 or X800, whereas Nvidia users require two SLI cards.

SLI only supports certain games, but Nvidia disputes ATI's claims that Crossfire runs on a lot more.

MSN takes on Google at the desktop
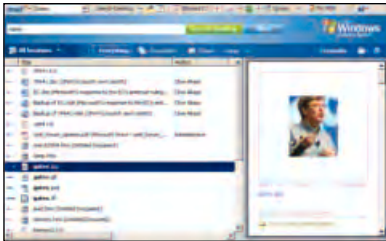
MSN's desktop search window, summoned by a toolbar query box, is much faster than an XP search

MSN has officially launched a desktop search bar in its latest bid to challenge the dominance of the Google search engine. Like its Google equivalent, the utility creates an index of all files on your PC or in any nominated network directory or drive.

The MSN search toolbar (see **www.msn.co.uk**) can in most instances be used instead of Windows XP's extremely cumbersome search facility. XP allows you to narrow your search by time and location, if you can figure out how, but MSN's search is likely to be quicker even if it does produce more unwanted results.

It supports more than 200 formats including image files and pdfs. Microsoft, which owns the MSN network, stresses that its engine protects the privacy of users – an area where Google's equivalent has come under fire.

The company said: 'The MSN Search Toolbar is built on the current Windows security and privacy model, which is designed to respect the privacy of multiple users on a single PC by utilising the Windows authentication and user.'

Ask Jeeves is also offering a desktop search utility.
● Google has launched a search engine for UK mobile phone users. Google Mobile translates web pages into a format more suitable for small screens.

Grokster suit raises burning questions

A US court decision against file sharer Grokster leaves IT vendors facing a new grey area it was intended to clarify.

Grokster, which was sued by MGM, had successfully argued that it was not liable for what people did with its products. It cited the 1984 Sony v Universal Studios case, when Hollywood failed to halt the use of Betamax video recorders because the judge ruled they had legitimate uses.

The US Supreme Court has refined that ruling by saying vendors could be liable if they encourage people to use their products to break the law. And it decided this is what Grokster and co-defendant Streamcast Networks had been doing.

But what constitutes encouragement? The ruling could affect peer-to-peer (P2P) file sharers and the design and marketing of DVD and CD burners and associated software. These are legitimate products under the Betamax ruling, but their vendors could now be held liable if they are deemed to have promoted illegal copying.

Some analysts say the ruling could promote P2P sharing by forcing it to go legitimate.

Windows 2000 was given a last-minute update before Microsoft ended full support for the product on 30 June. Microsoft will now address only security issues in the five-year-old operating system for the next five years.

The 32MB Update Rollup, available at **http://support. microsoft.com/kb/89186**, includes all security updates published since the release of Service Pack 4 in 2003.

>> **Safe drives**
Lacie's Safe mobile hard drives (pictured) include fingerprint readers to prevent unauthorised access. The 40GB and 80GB models, available in August, cost £89 and £119 ex VAT respectively. **www.lacie.com**

>> **Firefox snub**
One in 10 UK websites is incompatible with Firefox, according to research from web testing firm Scivisum. Seven per cent use non-standard code recognised only by Microsoft's Internet Explorer.

Nearly 50 million people have downloaded Firefox, making it the second most popular browser on the market.

>> **Sun laptop**
Sun Microsystems has launched its first laptop, a mobile workstation running Solaris 10. It will sell at $3,400 (£1,890) and is equipped with Sun's Ultrasparc processor, 512MB of memory, a 40GB hard drive and Wifi connectivity.

>> **Mobile Quake**
Pulse Interactive and ID Software will bring the PC classic Quake to mobile phones. Up to 16 people can play at any time, and it will refresh at an unprecedented 25 frames per second.

Letters

Cheap and cheerful >

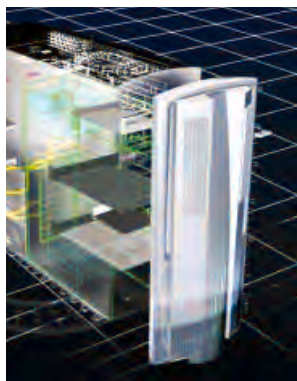How great minds think alike. Your decision in the August issue to build a computer was matched by mine, only I decided to build mine from the opposite viewpoint – as cheap as possible. I bought a second-hand Time microATX machine with keyboard, mouse and a 17in CRT monitor. I took out the motherboard, CPU and hard drive, kept the floppy and DVD drives. I replaced them with a Gigabyte board, AMD Sempron2400, 256MB of memory, CD-Rom drive, 40GB hard drive and a pair of speakers. This machine lets me run XP Home, Office 2003, Photoshop CS, Autoroute and lots more. The entire PC cost me less than £200. Less than five per cent of users need a machine such as the one you built. I now have orders for four machines and several enquires for more. I am no computer wizard although my experience started years back when I spent six months writing a program for the Acorn Electron, only to find out I could have done it on a spreadsheet in two minutes. Computers don't you hate to love them?

M Pammenter

In a jam >

I have an Imate Jam smartphone. It's got all I want (bar a camera flash) in a proper phone-sized unit. I've used its Bluetooth facility successfully with a variety of headsets.

I've bought a Seat Altea car with a built-in Bluetooth hands-free phone interface. None of the salespeople knew much about it, and didn't have a demonstrator for the Bluetooth, so I bought it on spec.

In theory, Bluetooth makes sense for hands-free – no more having to choose the phone to fit a car kit, or being unable to change the phone for the life of the vehicle. The car manual even spouts on about this standardisation under Bluetooth.

I was totally gutted when I found my phone won't work with the car's Bluetooth.

I was even more gutted when I called their helpline to be told, eventually, that it only works with a limited number of phones.

Surely the whole point is that Bluetooth is universal. Perhaps some advanced features might only work with the right phone software, but you'd expect to be able at least to make and receive calls!

Can you help me? Is there any Bluetooth connection software that may solve my problem? Is there a firmware or software upgrade available for either the car or phone? I can't even turn off the Bluetooth in the car. If I use my phone with a headset it keeps asking to connect to the car.

Please help as I think this manufacturer has sold me the car without thinking through the issue with Bluetooth at all.

Mark Hazelton

Kelvyn Taylor replies >
As many users will testify, Bluetooth standardisation and interoperability is still very elusive. It might be worth checking if there are any firmware updates available for your phone either from your network provider or from **www.clubimate.com**.

HP unhappy? >

My experience of HP's after-sales service is totally different to that of Tom Calverley ('HP happy', Letters, *PCW*, August 2005). I purchased an HP DVD Movie Writer

DC-3000 direct from HP via an Ebay auction on 2 June last year. I was under the impression that it would work with USB 1.1, which is all I had on my PC, but it didn't. So I left it for several months before buying a USB2 card which I installed in my PC, but it still didn't work. I then made the fatal mistake of thinking this was because the card was not the same as having 'real' USB2. In May I replaced my PC with one that has more USB2 ports than you can shake a stick at! But the product would still not work.

I then contacted HP support, who told me that the error message I was getting was

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✉ Letter of the month

Apptel Macs good for the future >

As a long-time Apple and PC user, I believe Apple's decision to use Intel CPUs can only be a good thing for the Mac user, especially as Apple has had problems getting a steady supply of Power PC chips from IBM.

As long as the operating system is tied to Apple hardware, then quality and stability issues will be the same as they are now, both excellent in comparison to Windows-based PCs. Also, being able to run Windows on my Mac at full native speed in a dual-boot configuration will negate the need for me to have a separate PC.

As a design student in multimedia, I use my Apple for the day-to-day tasks such as Photoshop, Illustrator and web design, only turning to the PC for 3D design work, as the extra grunt in speed terms is useful for cutting down rendering times.

If any future Apple I purchase can have the same processing power as my PC, then I will be a very happy Apple customer.

Billy Stewart

nothing to do with USB2, but was a fault with the HP hardware. If I could provide them with proof of purchase, they would look into replacing it. When I found the proof of purchase I discovered that the warranty given was a paltry six months, rather than a year. I emailed it anyway with a covering message, explaining that I had not succeeded in producing a single DVD from the unit and it had never worked.

I received a phone call from someone at HP who told me there was nothing they could do for me. Not only would they not replace or repair the unit under warranty, but they were not even prepared to repair it at my expense or suggest anywhere where I could take it for repair, other than the vague suggestion that I 'look on the Internet'. Unlike your other correspondent, I will never buy an HP product again.

Philip Scrivener

Kelvyn Taylor replies ›
I'm not sure that HP can be entirely condemned in this case, but the main lesson to be learned is that if you suspect a problem with your newly purchased hardware, you should notify the seller as soon as possible.

Scary servers ›

Right now I am playing around with media files and love the idea of using my PC to distribute content around my home to other PCs or media streamers. Your recent article on PC Recycling (*PCW* August 2005) talked about using an old PC as a media server – but the word 'server' starts to get me all a bit confused. If I have a wireless network, why can't I just play media files that are on one computer from whichever PC I am using? In short, what does a media server do, and why is it better than the setup I describe above?

Dan Renton

Kelvyn Taylor replies ›
Don't get put off by the word 'server' – in this case it just means an application that serves up media files to 'client' PCs – that is, exactly what you say you want to do. Of course if you really want, you could simply browse to a shared network folder and play any music that's stored in there, but the beauty of using streaming broadcast via Shoutcast or VLC is that a large number of remote PCs can access the stream simultaneously, so you could turn on any PC in the house and get the same music – it's effectively a home radio station. And VLC is a cross-platform media server, so you're not limited to Windows PCs.

Using an old PC for this frees up resources on your main PC, and keeps media files away from any important data on your main PC.

Clear voices ›

I would like to thank Alan Stevens for the clear and comprehensive article on VoIP (More choice for your voice, *PCW* July, page 141). As a designer and manufacturer in this market, understanding is one of the major stumbling blocks we face.

The technology for widespread adoption of VoIP is now available but convincing people to adopt it is more difficult. The cost savings and productivity gains for businesses are undeniable and it also has great potential in the residential market. Once service providers can combat the problems of compatibility, call quality, mixed environments and the ability to allocate a number for every service, the market will move beyond early adopters into the mainstream.

While cost reduction is currently the primary driver behind VoIP, the additional benefits include extra telephony services, billing management and the use of existing telephone handsets. I hope to see providers continuing the education process so that more companies and individuals can reap the benefits this technology has to offer.

Robert Mackinnon, UK product manager
Zyxel Communications

No-smudge CD printing ›

I've been a reader of *PCW* for ages. I have a feature idea for you – could you review printers that are capable of direct printing onto CDs and doing a half decent job? I try and use an Epson R300 to direct-print CDs. To say the product is dreadful would be an understatement – it is awful. Or is it the CDs that I print onto that are the problem?

I have problems getting the CD tray to be accepted by the printer without spending 10 minutes rectifying errors, and I dream of a smudge-free outcome!

Chris Walkland

Kelvyn Taylor replies ›
Thanks for the idea – we'll certainly consider it over the coming months. Regarding your smudging problems, Epson does recommend you leave the discs to dry for 24 hours. There are also clear lacquer sprays available (eg www.discprint.com/uk/spray/spray.html) for protecting the printed label, although we have no experience of using these.

Honey, I shrunk the PC ›

Although the prospect of walking around wearing your PC/phone/media player (News, *PCW*, August 2005) rather than having to use pockets is appealing, one subject I rarely see mentioned is how well these things are going to wash!

Mixing your socks with your shirts now just leaves you with a strangely coloured shirt collection (don't ask!) but if mixing the washes wipe out your music collection I can just imagine the backup problems!

John Fairhurst

No thanks, Mac ›

I am used to PCs and have years of experience of Windows, but have just landed a job where my principal computer will be an Apple Mac. Having used it I have no idea why everyone thinks it is so great.

It is difficult to navigate and any time anything goes wrong, it does little to help you fix the problem. It comes across as an early version of Windows, all 'look, don't touch'. For all its faults, I like my XP. I can get downloads and updates and so much software to make it run smoothly that, for the life of me, I see no reason for Apple's existence. In my opinion, anybody who thinks it is the better OS is deluded.

Peter Black

Ethical broadband? ›

I was very disappointed to see that you hadn't included any ethical broadband providers in your review in the July issue. Some of us look at considerations other than speed. Surefish is run by Christian Aid and all profits go to its campaigns and projects.

I am delighted with it as a broadband provider. I am aware it may not have a large market share but if more people knew about it through being featured in reviews in magazines, then the world might be a little bit better off.

Dr Janie Anderson

Small but perfectly formed ›

I've just seen the new compact edition of *PCW* in my local newsagents. What a great idea. Having just bought my July issue a couple of days before I only took a quick look in the shop.

Although the text is indeed smaller than the standard issue, the clarity of the font used seemed to make it very readable. And at a much lower cover price too! I would think for postal subscribers, particularly those overseas, it will be a real hit, especially when the lower postal costs are taken into account.

Even though I collect my own copy from the shop each month I may give this new format *PCW* a trial run next month.

Dave Cooper

Kelvyn Taylor replies ›
Thanks for the compliments – the compact edition of *PCW* is still undergoing trials at selected newsagents nationwide at a cover price of £2.75.

Will chip move bite into Apple sales?

While Intel CPUs will run fine in Macs, Gordon Laing has concerns about the timing of the announcement

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Forget the HP Compaq merger, Carly's resignation or 64bit processor roadmaps. The news that Apple really is switching to Intel processors for its Macs has generated more column inches of comment and speculation than almost any other IT story I can remember.

And why not? Seeing Apple boss Steve Jobs not just shake the hand, but hug Intel CEO Paul Otellini on the stage of Apple's annual developer conference before thousands of Mac programmers, must have shocked many Apple fanatics to their very core. I half expected poisoned darts to strike at one or both chiefs to put an end to such nonsense.

The Mac's market share may be small, but the passion of its followers is immense. Speak to any Mac enthusiast and they'll insist theirs is by far the superior platform in terms of both operating system and hardware. They'll claim their OS is powerful and stable, yet more elegant and easier to use then Windows, while the hardware runs quicker.

Apple's advertising has long preached the same message with specifically targeted benchmarks proving a PowerPC-based Mac can outperform an Intel Pentium-based PC – ahem, in certain tasks anyway. Yes, the PowerPC processor was the heart of what made Mac hardware great in the eyes of many vocal devotees and now they learn it will be torn out and replaced by what was always considered the enemy. You can imagine the mournful wailing: but why Steve?

Jobs pointed out what everyone was quietly ignoring: that the PowerPC processor has simply fallen way behind. Two years ago Jobs himself promised to deliver a 3GHz Mac desktop, a product which has still yet to materialise. More crucially, where's a G5 Powerbook to compete with current Centrino PC portables? And moving on, Jobs says Apple envisions great products but just doesn't know how to build them with the current PowerPC roadmap.

By switching to Intel, Apple gets to cosy up with a company that's committed to desktop and mobile processors, rather than tag alongside one which has become distracted by the glamour and volume of games console chips. The mobile aspect is crucial for Apple, as more than half of Macs sold are portables and mobile performance is where Intel currently leads its rivals.

But the evangelists needn't worry: the Mac won't lose any of its individuality by having an Intel inside any more than it did when it switched from SCSI drives and proprietary buses to ATA drives, USB, PCI and AGP technologies. Indeed apart from the PowerPC processor and its chipset, the insides of a modern Mac are essentially no different from a PC.

> **'Evangelists needn't worry: the Mac won't lose any of its individuality by having an Intel inside'**

The thing which makes a Mac special is its operating system and the fact that it knows exactly what hardware it will be running on. This won't change with the switch to Intel processors. So it's good news all round, right? Future desktop Macs should run quicker and Powerbooks can enjoy a world-class mobile platform. All you have to do is wait until spring 2006 when the first models should arrive. Trouble is, if you were in the market for a Mac between now and then, would you buy an old model or wait?

Apple may claim the transition to Intel will not be complete until the end of 2007 and that it has some great PowerPC products yet to come, but would you commit to a platform confirmed for replacement? During such transitions there are always claims of support for the legacy products and Apple has developer tools which can easily compile to both PowerPC and Intel Macs. But people are naturally wary of investing today when they know a superior product is replacing it in the near future.

And this is why many observers are talking about what's been described as the 'Osborne Effect'. Back in 1981, Adam Osborne launched the first transportable computer, the Osborne 1. It may have weighed 24lb but it delivered unparalleled portability for the day. Osborne reckoned he might sell 10,000 units over its lifespan, but soon shifted this number every month.

Soon enough, though, reports of an improved model emerged long before it would become available. Anticipating this, dealers stopped buying the old one and the resultant unsold stock helped contribute to the firm's bankruptcy. Apple's switch to Intel processors was the right decision, but is announcing it a year before it happens sensible?

One thing's for certain: Macs will run just fine with Intel processors. Jobs revealed every single release of OSX had in fact been compiled for both PowerPC and Intel platforms as part of a 'just in case' scenario – a process which had been going on secretly at Apple for five years. Indeed his on-stage demonstration was made using a Mac running a 3.6GHz Pentium 4 processor.

Ultimately, beyond a few highly vocal enthusiasts, does anyone really care what processor is inside a Mac? The important thing is to see the OSX operating system running smoothly on quick desktops and mobiles with long battery lives. And this is what Intel should bring to the party.

The switch from PowerPC to Intel is great news for the Mac platform. The real issue facing Apple is how sales will be affected in the year before the new models arrive. I wouldn't be surprised if dates get revised and the first Intel Macs arrive in time for Christmas.

Tablets could be the best medicine

Keyboard fans may protest, but others would welcome a device they can use standing up, says Guy Kewney

guyk@pcw.co.uk

On Toshiba's 130th anniversary, the company rolled out a tiny computer, literally half the size of the normal small notebook: the Libretto (see also news story on page 20).

I hate it. It has been a successful form factor in Japan, and this isn't the first time Toshiba has had a successful Libretto there, where clearly, the small keyboard is acceptable. I can't tell you why it might be acceptable to Japanese users, but it's certainly not acceptable to me. As far as I'm concerned, a keyboard should be keyboard sized, or thumb-board sized like the original Psion Series 3.

The following day, I played with the new Motion sub-tablet. In many ways, you might say the Motion was a lower spec machine. For example, the new Libretto has a high-definition display, 1,280 x 768 pixels, suitable for watching widescreen DVD movies. And it has a suitable add-on: a DVD drive that clips under it. By contrast the Motion has 600 x 800 pixels – almost a joke in a world that regards XGA-resolution as the absolute basic.

Putting the two mini-PCs side by side, there's no question which one I'd want to use. Same form factor, but totally different usability.

I don't like writing with a pen. I'm a keyboard junkie. Seriously, I can barely write: I am far too impatient a person to crawl along at handwriting speed when a Qwerty keyboard is my servant. I can type at 100 words a minute, or even faster if I don't mind some errors.

Worse still, when I try handwriting, I can't read it. Neither can the computer; my experiments with pen input are easily the worst failures of anybody I know. Here's a sample: It's as it I had never Iosrodooada... ah, forget it.

Nonetheless, I'd rather have the Motion tablet. For a start, I wouldn't expect to be Qwertyless. I'd get a collapsible Bluetooth keyboard, which is small and light. Motion designers are expert in finding ways to make a Tablet stand up without a keyboard base, and so if I were able to find a chair and a table, I'd be OK. By contrast, if I were standing up trying to use the Libretto keyboard, I'd be sunk; and if I were sitting down, I'd not be very much better off.

We're on the verge of a big change in PCs: the time has come to take the tablet seriously. That means asking ourselves several hard questions. The hardest one is whether we really are avoiding situations where we might use a computer standing up.

Pocket PCs and Palm PDAs show that the answer is probably yes; when the first pen-driven PDAs appeared, they exploded into the market. Today, the lesson of the PDA is being interpreted negatively; sales of the PDA are not rising, and the few devices that are sold are being used together with GPS devices. My own interpretation is not that people don't like pens, however: I think the problem is that people don't want something that isn't a phone. We need to keep in touch and the phone makes that possible. Given a choice between something to play with, however great, and something to call home with, we take the phone.

Until now, the choice has been between something big and heavy, and something pocket sized. Take something Libretto or Oqo sized, and make a Tablet out of it, and the game changes: suddenly, you realise that this will run full-screen PC software, and you can rest it on one arm and write on it with the other.

The other thing that's changed is Microsoft's attitude. The last time I wrote about tablets, I castigated Bill Gates for saying that he was a big fan of the format, and giving the lie to this by penalising those who used it by charging a huge premium for the Tablet OS.

Today, the price of Tablet Edition XP is still higher than ordinary XP Pro, and I still think this is a dumb move. But at least the margin is much less; some PC makers are talking about a $15 (£8.50) delta for the extra features. And that means you can get a Tablet for about $100 more than the equivalent notebook.

> **'The time has come to take the tablet seriously. That means asking several hard questions'**

So, who will buy it? First, schools. They traditionally don't have a high budget, but then again, they don't have high aesthetic requirements. Very ordinary displays will do. Chunky, lumpy devices are OK, battery life isn't critical. But what is critical is that they are accessible to young users; and there, the tablet scores. Typing doesn't come easy to the primary-school student; they find writing on a tablet far more natural, and it encourages the dyslexic, according to Research Machines, who may otherwise be daunted.

Then, a lot of people who have been struggling with the tiny screens of Pocket PCs, and hating them: car rescue services, factory production people, delivery van drivers, and so on. For some, the power of a Pocket PC processor will be enough, but for others, a half-sized tablet may just make it possible to access power applications out in the field.

The time has come to rethink. I'm not utterly sold on tablet computing, but suddenly, I'm going to pay more attention.

Come back cables, all is forgiven...

Barry Fox discovers, to his frustration, that using Bluetooth with PCs is fraught with complications

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A reader wondered how he could be sure, before buying, that a Bluetooth headset would work with his PC for use with IBM Viavoice. Manufacturers' websites ducked the issue. He saw an advert on Amazon for a Plantronics headset listed as 'compatible with phones, PDAs and PCs'. But a few days later the listing had been changed to omit any reference to PCs.

Welcome to the big wide world of Bluetooth mess. I have tried several headsets, all of which work with a mobile phone, but none with a PC. As Plantronics assures that 'any of Plantronics' range of Bluetooth headsets can be used with a PC', I borrowed an M2500 to check.

The Quickstart Guide only explained how to make the headset work with a mobile phone, not with a PC. Through trial and error, I eventually got my PC and its USB Bluetooth dongle to recognise and pair with the headset. Once, by happy accident, I got very poor-quality sound from the PC through the earpiece. Since then, I've had nothing. A setting somewhere is wrong – all I need now is to find it.

I have asked Plantronics several times if there is an instruction manual for users. After a month, all I have is the promise that someone from Plantronics will call me, but no-one has.

Bluetooth was conceived with the best intentions: a simple wireless connection tool that works over very short ranges (around 10m) so does not cause interference and is not susceptible to hacking from the street. The cellphone industry adapted it for wireless headsets and made it almost easy to set up. But connection to a PC is absurdly complicated and confusing to use.

Some headsets just do not have the firmware 'profile' needed to connect to a PC. They connect only to a cellphone. Often, this vital distinction is not made clear on the packaging. The only safe way to buy is to ask the shop for a 'headset that connects to a PC'. At least you are then protected by consumer laws if they ignorantly sell you one that only works with a mobile phone.

To add to the profile confusion, when Windows XP is updated with Microsoft's Service Pack 2, USB Bluetooth adapters are likely to stop working because SP2 overrides the software drivers that came with the adapter and installs the Windows generic software. The PC is then unable to use the adapter so cannot connect with anything.

This is documented in daunting detail on Microsoft's support website, under the search heading 'Cannot install a Bluetooth device after you install Windows XP Service Pack 2' (**http://support.microsoft.com/?kbid=840635**). The symptoms are: 'You cannot install a Bluetooth adapter, and… the device installation appears to work correctly. However, when you view the devices that appear under Bluetooth radios in Device Manager, the device is incorrectly identified. If you try to configure the device, you receive an error message that is similar to the following error message: Device not found.'

Microsoft then suggests workarounds of mind-bending complexity. 'Rename the Bth.inf file…Rename the %WINDIR%\inf\Bth.inf file to Bth.bak before you install or reinstall the third-party device or stack… Click Start, click Run, type %windir%\inf in the Open box, and then click OK', followed by more renaming of files to fool SP2.

The manufacturers of Bluetooth devices all have their own recommended fixes. Sitecom (**www.sitecom.com/faq_2.php**) advises: 'Install the widcomm 1.4.2.11 driver. Go to Device manager and right-click the Generic Bluetooth Radio. Select "update driver". Choose "No, not this time" and click Next. Select "Install from a list or specific location (advanced)" and click Next. Select "Don't search, I will choose the driver to install"' and so on.

Motorola posted a series of screenshots showing how to con SP2 into allowing a USB Bluetooth adapter and its Mobile Tools software to work. (**http://commerce.motorola.com/consumer/QWhtml/support_bluetooth.html**).

Bluetooth is an industry standard, so how on earth could Microsoft have released SP2 without first checking what it did to Bluetooth adapters?

Meanwhile Bluetooth keeps growing new profiles. Motorola plans to use the new long-range, stereo version (Advanced Audio Distribution Profile, or A2DP) to pipe music in the home.

Motorola's original announcement was made at CES in January 2004, with the promise that A2DP will 'turn most stereos into a wireless music system'. The Motorola DC800 was meant to be available in the first half of 2005 to stream music 'from the stereo and Bluetooth wireless-enabled mobile phones, PCs or other devices'. With no sign of one, I asked Motorola for an update and was told it would ship in June, together with the Bluetooth Stereo headset. 'We are also just about to launch our new Bluetooth Class 1 dongle with A2DP profile, which means it handles streaming stereo. We have worked hard with our vendors to improve the usability of the Mobile Phone Tools software, including a launch of MpT v4 in July. It is an incredibly important part of the overall proposition, specifically when it comes to the multimedia and music-orientated devices.'

Yes indeed. If the DC800 music streamer is as hard to get working as the other PC Bluetooth kit I've tried, good old-fashioned wire cables will come as a blessed relief.

> **'How could Microsoft release SP2 without checking what it did to Bluetooth adapters?'**

Good intentions, bad inventions

Rory Reid pleads for a sanity check so that pointless products don't get ideas above their station

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The amount of rubbish that passes through *PCW*'s offices is quite startling. Fortunately it's not the smelly kind that attracts foxes and other vermin, but the technological kind invented by companies desperate to create new and, frankly, unnecessary products.

Don't get me wrong – I support innovation just as much as the next man and I certainly don't bemoan Henry Ford's invention of the automobile on the grounds that the horse-drawn carriage was adequate for the task. What annoys me is the invention of devices that incorporate useless or unusable functions or whose very existence is utterly pointless.

In Japan these products are defined as 'Chindogu', which literally translated means weird/unusual ('chin') tool ('dogu'). The term was coined by Kenji Kawakami, a Japanese inventor and writer who first made the idea prominent in the mid-1990s with such quirky inventions as duster slippers for cats, so your feline pet can help with the household chores as it walks around the home. This is of course supposed to be a form of satirical humour, but it seems the IT industry has begun designing Chindogu-style products, safe in the knowledge that consumers will buy just about anything with an LCD screen attached.

In the world of IT, the list of utterly pointless products is extensive. No disrespect to the companies involved, but, for example, how many users really need a motherboard that accepts both Intel and AMD CPUs? I've been building PCs for years and not once have I ever considered swapping between same-generation CPUs from rival manufacturers. When I upgrade it usually involves a next-generation CPU (invariably with a new pin layout), memory and chipset. I admire the technical innovation of such products, but I really can't see much practical sense in them.

Another of my pet peeves is Portable Media Centres (PMC). Just like handheld television sets of the 1980s, the idea is sound; a small device that lets you watch video while on the move. But have you ever seen anybody using one? I'm not even sure the general public knows they exist. The thought of walking into a lamppost while using one or being robbed just because you couldn't wait to watch last night's *Eastenders* isn't very appealing.

While there may be some people who could make use of the above-mentioned technologies, I can't see any reason for the existence of devices that incorporate mp3 playback as an added 'bonus'. Mobile phones – maybe. But mp3 digital cameras? Mp3 watches? Again, the theory is sound, but don't be surprised when you are

mocked by trendy Ipod listeners because you're bopping your head to the sounds of your camcorder or have a cable dangling between your ear and wrist.

These so-called 'hybrid' products are one of my major annoyances. If any of my friends spent £160 on a set of digital camera binoculars (a digital camera in the shape of binoculars), I'd disown them instantly. Pentax was responsible for the first of these abominations, but later saw sense and discontinued it from its product line.

And don't get me started on the amount of pointless products inspired by the Universal Serial Bus (USB). While I can see the novelty value attached to a USB ashtray that helps reduce cigarette odour and predicts when the smoker will die of lung cancer, I still can't figure out why anyone would invent a USB noodle strainer. These products exist, which means someone somewhere is buying them. Please stop.

Another thing which gets my goat is when companies deliberately feed consumers misinformation to gain sales. A prime example is the megapixel marketing strategy employed to sell digital cameras, which implies that the megapixel rating of a camera is a direct reference to the quality of its images – a fact which simply isn't the whole story.

> **'Consumers need to use more discretion in order to ensure the swift demise of pointless goods'**

The problem isn't limited to the world of IT. In the United States Coca-Cola has just released Coca-Cola (C2) – a low-carbohydrate version of its popular soft drink. Canny readers may have already spotted that a 'low-carb' version of Coke already exists in the form of Diet Coke. C2 may taste more like standard Coke than its Diet cousin, but it also contains 12 times as many carbs. If you're willing to alter your normal dietary habits so drastically as to eat nothing but greasy fry-ups for breakfast, lunch and dinner, I'm sure you can stomach the minor difference in taste between Coke and Diet Coke.

In the old days, people invented things out of necessity. Today, they do it to bamboozle consumers and create or take advantage of new trends. Admittedly, the IT industry is largely reliant on Darwin's 'survival of the fittest' theory, but I believe consumers need to use more discretion in order to ensure the swift demise of pointless goods.

Reading reviews is one way of finding out whether you should part with your hard-earned cash, but even seasoned IT journalists can fall foul of ideas that seem great one minute, but useless the next. What I ask is that we all exercise a little more common sense. Don't buy into the fads, since this leaves less room in the market for decent products and less money in your pocket for something that really does deserve your attention.

Reviews

EXCELLENT ★★★★★ VERY GOOD ★★★★★ GOOD ★★★★★ BELOW AVERAGE ★★★★★ POOR ★★★★★

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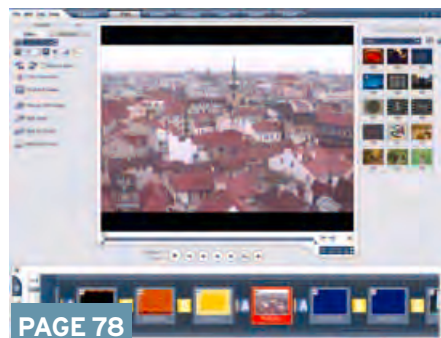
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Once you've transferred movies from camcorder to PC, Videostudio 9 can help you edit them

If there's one sector of the PC market that progresses faster than any other, it's graphics cards. Buy the latest model, and within six months (probably earlier) it will have been superseded. Just a few weeks ago Nvidia launched its latest card, the Geforce 7800 GTX. With Nvidia claiming the new design is as fast as not one, but two Geforce 6800 Ultras running in an SLI (Serial Link Interface) configuration, we were keen to be one of the first to test it. You can read a review of Gigabyte's 7800 GTX on page 73.

Although it's always good to see new and faster technology, we're often left feeling these advances in graphics processing are over-hyped. Take the game Grand Theft Auto: San Andreas (reviewed on page 196) as an example. It's a truly enthralling game with a gripping storyline, but the graphics fall way short of what today's cards are capable of doing. The reason? Games developers appear more concerned about gameplay than fancy-looking graphics – something we wouldn't argue with. But, if you want the fastest card currently available, Nvidia's 7800 GTX is for you.

Also this month, Mesh, which is never slow to take advantage of the latest kit, has submitted a PC that not only contains the new 7800 GTX, but also AMD's latest Athlon 64 CPU – the FX-57. Initially, we were worried that Mesh's submission would be too expensive even for enthusiasts. However, as you'll see opposite, it's tremendous value for money.

High-speed wireless networking in the home is proving to be big business these days, and the major manufacturers are all busy trying to pre-empt the forthcoming 802.11n standard (which probably won't arrive until 2007). We've got four of the latest Mimo (multiple input, multiple output) routers on test, but be warned that none of them are likely to work with 802.11n kit once the standard is ratified.

Staying with a wireless network theme, we've reviewed two of the latest wireless IP cameras on page 61. Set up one of these in your home and you'll be able to keep an eye on exactly what's going on when you're away.

Moving on from hardware, we've also got a great selection of software. You'll find reviews of the budget video-editing package Videostudio 9, Readiris 10 and, for those fed up with Microsoft, Mandriva Linux – formerly Mandrake.
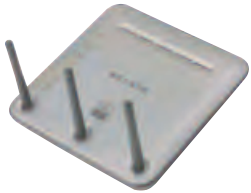
`GAMING PC`

Mesh Matrix Titan FX57 GTX

Find out whether the new Athlon CPU is a match for dual-core

In the August issue of *PCW*, Mesh gave us an insight into the future of desktop computing with the Titan Dual X2 Pro – one of the first PCs to use a dual-core CPU. While this delivered great performance in multitasking and processor-intensive applications, it didn't offer any advantage for gamers.

Enter the Mesh Matrix Titan FX57 GTX; a PC equipped with the latest graphics card (the Gigabyte NX78X256V-B – see page 73 for a full review) and AMD's brand new games-oriented processor, the Athlon FX-57. Although the FX-57 uses the same 1MB of Level 2 cache as its closest relative, the FX-55, it distinguishes itself in other ways, most notably by running at 2.8GHz – 200MHz faster than any other AMD CPU.

The FX-57 is created using the same 90nanometer fabrication process that recently benefited AMD's dual-core X2 4800+ CPU. As a result, it has a lower operating temperature than the FX-55 and draws less power when running at full steam. The FX-57

also has an improved memory controller. An FX-55 system with all four of its Dimm slots occupied by 400MHz modules could cause a drop in speed to 333MHz. In contrast, the FX-57 is designed to ensure your Ram runs at a consistent 400MHz.

The FX-57 supports the SSE3 (Streaming SIMD Extensions 3) instruction set, traditionally found in Intel Pentium CPUs. It's designed to help improve the performance of multimedia and gaming applications, but most users won't see the benefit since not much software takes advantage of it yet.

In Sysmark 2004 SE, Mesh's powerhouse posted a solid result of 219, in line with the fastest FX-55 PCs we've reviewed. It lags some way behind single-core 3.7GHz Pentium 4 Extreme Edition PCs, and even further behind those that use the dual-core Athlon X2 4800+.

Where it excelled, however, was with its graphics performance. The FX-57 is touted as the world's fastest gaming CPU

and Mesh has tried to make the most of its performance by pairing it with the world's fastest graphics card – the Geforce 7800 GTX. The resulting 3Dmark05 score of 7,703 is the highest we've seen in a PC that uses a single graphics card.

Real-world results were also impressive. Although its Far Cry frame rate of 58.04fps (frames per second) wasn't very high in comparison to lower-end systems, it helped run Doom 3 at 51.8fps.

In trying to keep the PC affordable, Mesh has supplied a 19in TFT monitor. Although the Viewsonic VX924 is a quality screen, it has a native resolution of 1,280 x 1,080 – the same as the majority of 19in and 17in

models. If you're a demanding gamer (at whom this PC is aimed), you'll be sorely disappointed that you can't push the hardware to the limit by running games at a resolution of 1,600 x 1,200. A 20in TFT would have been more a logical choice.

Also included is a Logitech cordless keyboard and mouse and a set of 7.1 Creative speakers, which go well with the Asus A8N SLI motherboard's eight-channel onboard audio card. On the software front, Mesh ships XP Home Edition (the most basic XP operating system) and a decent collection of video-editing and home cinema titles. You don't get much else; there's no TV tuner, joystick or gamepad, and no game demo to put the hardware through its paces.

Should things go wrong, Mesh offers an impressive three-year on-site hardware warranty, which covers parts and labour.

Despite some slight drawbacks, the Matrix Titan GTX is a fine PC. Given the choice, we would opt for a similarly priced computer with a dual-core CPU, but if games are your priority it represents excellent value for money.

Rory Reid

PERFORMANCE

			219	

0   100   200   300
Sysmark 2004 SE

				7,703

0   2,000   4,000   6,000   8,000
3Dmark05*

* Tested at 1,024 x 768 in 32bit colour

DETAILS

RRP £1,643.83 (£1,399 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Mesh 0870 046 4747
www.meshcomputers.com
SPECIFICATIONS
AMD Athlon FX-57 • 2GB PC3200 Ram • Viewsonic VX924 • 256MB Geforce 7800 GTX • 300GB hard drive • Sony DW-D23A • XP Home, MS Works 8 • Cyberlink PowerDVD, Powerdirector 3 • Creative T7900 • Gigabit Lan • 3yr on-site warranty
PROS Gaming performance; value
CONS 19in monitor
VERDICT
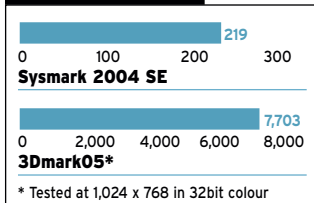**The ultimate gaming PC, but would be even better with a monitor upgrade**

FEATURES	★★★☆☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

TURION NOTEBOOK

Evesham Quest Roma

AMD gives Intel a run for its money

It's generally accepted that, when it comes to processors, AMD's offerings present better value for money than their Intel rivals. The latest processor war between the two giants is centred on the notebook market, where AMD's Turion 64 Mobile is presenting itself as a 64bit challenger to the Centrino.

The Evesham Quest Roma T37 uses the AMD MT-37 processor, currently the fastest in the Turion range with a clock speed of 2GHz. It did well in PCmark 2004 with a score of 3,765, which compares well with similarly specified notebooks using Intel's Pentium M processor.

With a 128MB Mobility Radeon X700 graphics chipset, 3D results were also impressive. This score might not compete with that of a dedicated gaming notebook, but it will have no problem playing the latest games at reasonable quality settings.

An 80GB hard disk is what we would expect for a notebook of this price, as is the inclusion of integrated 802.11g and Bluetooth. It's a shame Evesham has used a Sony DVD writer that will only play ball with the 'plus' DVD format.

The 15.4in widescreen looks good and displays crisp images at its native resolution of 1,280 x 800. A battery life of one hour 56 minutes is reasonable for a notebook with this much power, but it's dwarfed by many laptops using Intel's latest Centrino technology.

For £900, Evesham has included a lot of decent hardware for a very reasonable price.

Luke Peters

DETAILS

RRP £899.98 (£765.94 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Evesham 0870 160 9500
www.lowestonweb.com/quest
SPECIFICATIONS
AMD Turion 64 MT-37 • 512MB of Ram • 80GB hard drive • 128MB ATI Mobility Radeon • 15.4in display (1,280 x 800) • 802.11g • Bluetooth • Dual-layer drive • 4 USB • XP Home • 1yr RTB warranty
PROS Fast processor; value
CONS No DVD 'minus' format
VERDICT
A great notebook that shows AMD processors can compete with Intel technology at a fraction of the cost

FEATURES ★★★★☆
PERFORMANCE ★★★★☆
VALUE FOR MONEY ★★★★★
OVERALL ★★★★☆

PERFORMANCE

3,765

| 0 | 1,000 | 2,000 | 3,000 | 4,000 |

PCmark 2004

1:56

| 0 | 1:00 | 2:00 | 3:00 | 4:00 |

Battery life (hours:minutes)
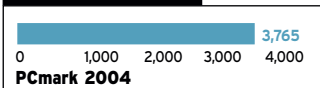
GAMING NOTEBOOK

Dell Inspiron XPS

Good looks, but at what cost?

The Inspiron XPS Generation 2 is Dell's attempt to crack the burgeoning market for gaming notebooks. Dell has certainly pushed the boat out when it comes to design, with the XPS having distinctive looks. Under the hood sits a 2.13GHz Pentium M processor, with 1GB of 533MHz Ram and a 256MB Nvidia Geforce Go 6800 Ultra.

The 6800 Ultra helped the XPS to a score of 11,198 in 3Dmark03 and 4,899 in 3Dmark05. In terms of graphics power, this is the fastest notebook we've ever seen, but it let itself down in performance elsewhere with a Sysmark 2004 SE score of just 156. While this isn't bad for a Pentium M machine, it holds the notebook back a bit. This is largely due to Dell's use of the Pentium M, rather than the Pentium 4 favoured by most gaming notebook manufacturers. It does have advantages in power consumption and generated heat, as the notebook remains fairly cool throughout, whereas P4s can become disturbingly hot.

The XPS weighs 4kg, which is about average for gaming notebooks, and its design makes it easy, if heavy, to carry around. Several lights adorn the case, the colour of which can be changed using a supplied utility.

The only problem with the XPS is the price. At over £2,500 it overshoots most budgets. Being a Dell, you can configure it on the website before buying and bring the price down if you remove certain options, but of course you'll lose out on performance.

Anthony Dhanendran

DETAILS

RRP £2,548 (£2,168.51 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Dell 0870 907 5818
www.dell.com/uk
SPECIFICATIONS
Pentium M 2.13GHz • 1GB 533MHz DDR Ram • Nvidia Geforce Go 6800 Ultra 256MB • 100GB hard disk • NEC ND6500A DVD-RW • Integrated 802.11b/g • 17in TFT screen • Windows XP Home • 4kg • 3yr on-site warranty
PROS Excellent graphics performance
CONS Very expensive
VERDICT
Awesome graphics performance, but the price tag will put this notebook out of reach for many

FEATURES ★★★★☆
PERFORMANCE ★★★★☆
VALUE FOR MONEY ★★★☆☆
OVERALL ★★★☆☆

PERFORMANCE

156

| 0 | 50 | 100 | 150 | 200 |

Sysmark 2004 SE

1:24

| 0 | 1:00 | 2:00 | 3:00 | 4:00 |

Battery life (hours:minutes)

Motion LE1600

A neat product for a niche market

Tablet PCs have had a rough time of late. Many people find them unwieldy to carry around, but that's because they're not really designed for the mainstream consumer market. Instead, they're far more suited to places such as hospitals and businesses where note-taking and form-filling is common.

The LE1600 houses a 1.5GHz Pentium M processor alongside 768MB of Ram – Motion Computing added an extra 256MB to our review unit, pushing the price up by £53. The impressive 12.1in screen uses Motion Computing's View Anywhere technology to produce a bright display that works well outdoors, but if you don't require this, you can knock off £193. A 30GB hard drive is supplied as standard and there's also a fingerprint reader for extra security.

Windows XP Tablet Edition 2005 has been around for a while, but its handwriting recognition is second to none. Even if your writing is untidy, you'll find it good at converting scribbles into text. As well as handwritten notes, Motion Computing has taken speech recognition to heart with the LE1600. Through the Speak Anywhere software, the LE1600 uses two microphones to increase accuracy.

The LE1600 whirred away for two hours, nine minutes in our battery life benchmark. If you want to improve on this, a slim extended battery module is available for £151. This more than doubles the battery life to just under five hours.

It might be a niche market, but the LE1600 is one of the best Tablet PCs currently available.
Will Stapley

PERFORMANCE

	2,362
0 1,000 2,000 3,000 4,000	
PCmark 2004	

	2:09
0 1:00 2:00 3:00 4:00	
Battery life (hours:minutes)	

DETAILS

RRP £1,773 (£1,509 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Motion Computing 02476 311 685
www.motioncomputing.co.uk
SPECIFICATIONS
1.5GHz Pentium M (low voltage) • 768MB of Ram • 30GB hard drive • 2 USB • Infra-red • Bluetooth • 802.11g • 296 x 18.7 x 240mm (w x d x h) • 1.4kg
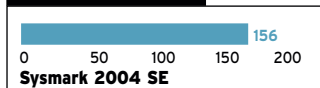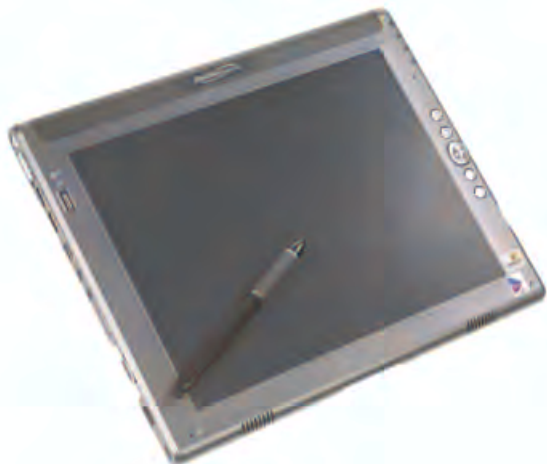**PROS** Good features; well designed
CONS Poor standard battery life
VERDICT
Motion Computing has created a real gem with the LE1600

FEATURES	★★★★★
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆
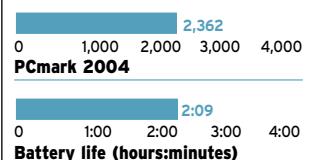
Dialogue Flybook

Small and quiet with interesting features

If the Motion Computing LE1600 tablet (reviewed left) is too cumbersome, Dialogue has a smaller alternative.

Instead of using Windows XP Tablet Edition, the Flybook runs standard Windows XP Home. Handwriting recognition is done by Dialogue's Ritepen software, which looks a poor cousin in comparison to Microsoft's tablet OS. Compounding the problem is the passive stylus, meaning the screen can confuse your hand for the pen. On the plus side, it does allow you to operate the touchscreen with your finger.

The Flybook runs off a 1GHz Transmeta Crusoe processor. It doesn't compare well to the performance of a Pentium M, but runs cooler, allowing quiet operation.

We expected battery life to be better than the one hour, 29 minutes achieved, although bear in mind this is with the notebook running at full pelt. If you're just word processing, expect around two hours, 30 minutes.

An interesting feature is the integrated 3G/GPRS phone. Put your Sim card in the side of the chassis and you can make calls, send SMS messages and access the web. Other wireless options include Bluetooth and Wifi. With no room for an optical drive, you'll need to factor an external model into the price.

The Flybook is quite unlike anything we've seen. It's small, quiet and has some interesting features. It's crying out for XP Tablet Edition, but Dialogue has no plans for this. If you're interested, we'd recommend waiting for September's update.
Will Stapley

DETAILS

RRP £1,399 (£1,190.64 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Micro Anvika 020 7467 6050
www.microanvika.com
SPECIFICATIONS
1GHz Transmeta Crusoe TM5800 • 512MB of Ram • 40GB hard disk • 8.9in screen (1,024 x 600) • ATI Radeon Mobility • PC Card slot • Bluetooth • 802.11b • 3G/GPRS • Video-out • VGA-out • 2 USB • 2 Firewire • 235 x 155 x 31mm (w x d x h) • 1.2kg
PROS Small, light and quiet
CONS No XP Tablet Edition; 802.11b
VERDICT
A neat little product, but flaws such as no 802.11g or XP Tablet Edition hold it back

FEATURES	★★★★☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

PERFORMANCE

	978
0 1,000 2,000 3,000 4,000	
PCmark 2004	

	1:29
0 1:00 2:00 3:00 4:00	
Battery life (hours:minutes)	
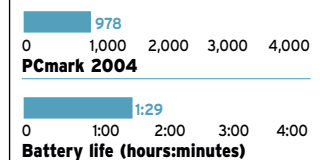
IP CAMERA

D-Link DCS-2100G

Get surveillance with sound

Webcams are great for videoconferencing and catching up with friends over the Internet, but if you want something a little more versatile, consider investing in an IP camera.

Hooking up directly to a router, an IP camera runs its own web server and will let you view footage over the Internet without the need for a PC. Among a number of other uses, IP cameras are perfect as home security devices.

D-Link's DCS-2100G is an 802.11g IP camera and comes with all the kit required to hook it up to a router either wirelessly or wired – although if you're going to connect it directly to a PC you'll need a crossover Ethernet cable. The lens focus can be adjusted, but only by hand (that is, not via the Internet) and D-Link made the sensible decision to include a microphone in the casing.

Setup was reasonably simple, but the process of sorting out port forwarding on your firewall may be more of a struggle. The web interface is clearly laid out and there is a good range of features, including the ability to set up a monitoring schedule. Motion detection sensitivity can be adjusted to prevent false alarms.

Video size reaches a maximum resolution of 640 x 480 at 30fps (frames per second). Although you won't get smooth video over the Internet at this resolution, it does allow for decent-sized shots to be taken should the motion sensor be triggered.

During operation, we found the device generated far more heat than the Panasonic BL-C30 (see review right), so we'd advise giving it plenty of breathing space. The DCS-2100G is more expensive than we expected, but it's got some good features and is relatively easy to set up.

Will Stapley

DETAILS

RRP £238.24 (£202.76 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
D-Link 020 8731 5555
www.d-link.co.uk
SPECIFICATIONS
640 x 480, 320 x 240 & 160 x 120 resolutions • Up to 30fps • Manual focus lens f1.4 • Integrated microphone • 802.11g • 10/100 Ethernet • UPnP • 200g • 91 x 79 x 140mm (w x d x h)
PROS Built-in mic; simple setup
CONS No ability to pan the lens remotely
VERDICT
Expensive considering you can't pan the lens remotely, but built-in mic is a good feature

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

IP CAMERA

Panasonic BL-C30

Pan-and-tilt lens, but no microphone

Panasonic provides us with the second IP camera this month. Like the D-Link DCS-2100G (see review left), it can operate both wired and wirelessly. Physically, however, the BL-C30 looks very different as it is more compact.

The BL-C30's biggest claim to fame is its ability to remotely control the direction of the lens. It can pan between +/-50º horizontally and +/-40º vertically. As with the D-Link, though, there's no optical zoom function. A more important feature that's missing is an internal microphone, so all your footage will have to be video only. Considering the low cost of microphones, the lack of one is surprising.

The web interface lets you adjust the various settings and is, on the whole, well designed. As with the D-Link, you'll need to configure your router to allow the BL-C30 access to the Internet. Operation times can be scheduled for the camera and, using a heat detector, it's able to detect movement – this works just like a standard motion detector, but with greater accuracy. Captured screenshots can automatically be emailed or sent to an FTP site, although setting up the transfer process can take a bit of time.

A night mode is also available and boosts the brightness levels in low-light conditions, but don't expect it to illuminate pitch-black scenes.

If you're using the BL-C30 as a public access camera, a small button on the front, combined with an indicator LED, allows you to switch it to Privacy mode – the lens then tilts up into the body of the casing.

With the ability to move the lens remotely, the BL-C30 boosts its appeal as a security device, but it's a shame there's no built-in microphone.

Will Stapley

DETAILS

RRP £305 (£259.57 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Panasonic 0870 907 0357
www.panasonic.co.uk
SPECIFICATIONS
640 x 480, 320 x 240 & 160 x 120 resolutions • Up to 15fps • +/-50º horizontal pan • +/-40º vertical tilt • Fixed focus f2.8 lens • Night view mode • 802.11g • 10/100 Ethernet • UPnP • 200g • 98 x 61 x 74mm (w x d x h)
PROS Moveable lens; good features
CONS No microphone
VERDICT
A built-in microphone would have been good, but this is still a decent IP camera

FEATURES	★★★★☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

Mid-range digital camcorders

These digital delights are smaller and better value than ever before. We test out five

RECOMMENDED

PERSONAL
COMPUTER
WORLD

Left: The Canon MV850i is very portable and extremely easy to use

Above: Lots of extra features justify the JVC GR-DF420's price

Digital cameras have plummeted in price over the past year or so, and now digital camcorders appear to be following suit. As more advanced features start to appear on the high-end models, such as hard-disk, DVD and High Definition options, the price of MiniDV-based models has been driven down. You can now buy a decent digital camcorder for the same price as a 5megapixel digital camera.

As with most digital versus analogue comparisons, the advantages bestowed to digital camcorders are better image and audio quality, smaller and lighter designs and both easier and more advanced connectivity options.

All the devices compared here use MiniDV – a tape-based format that records moving images digitally. It captures 500 lines of video, which is around 20 per cent better than Hi8 or SVHS analogue formats.

Although most models house a digital still feature, if you're planning to double up your camcorder as a digital camera it's worth bearing in mind that the low image resolution will restrict you a fair amount. You'll be looking at shots under 1megapixel, which will only just stretch to 6 x 4in prints.

Canon MV850i

Although the MV850i is the heaviest device in this round-up, it's still perfectly portable and, more importantly, extremely simple to use. Flick on the Easy mode switch and the camera will take care of everything from focus and white balance right through to image stabilisation. Turning off the Easy mode allows you to pick from 10 preset scene modes depending on your shooting environment. Most settings can be tinkered with manually, even the focus – until recently a feature reserved for higher-priced digital camcorders. The 2.4in LCD screen is the smallest here (admittedly by only 0.1in), but it's bright and clear and works well outdoors.

The Night-mode feature activates a small LED on the front of the camcorder, but we found it slows down the refresh rate of the LCD quite dramatically. Nevertheless, image quality was consistently good throughout our testing, producing rich colours and bright images. A true 16:9 anamorphic mode allows for shooting in widescreen, while a separate wide-angle lens adapter is bundled in the box to take full advantage of this. The 22x optical zoom felt a little unresponsive, but it's a decent size for a zoom lens.

Software is included for still photos, but there's no dedicated application for editing video. Considering the low resolution still shots the Canon is capable of, some video-editing software would have been more useful. Overall though, it's a great little camcorder.

JVC GR-DF420

The JVC is one of the most expensive models here, but the price is justified somewhat by its extra features. A useful tool is the ability to the check battery life and remaining recording time when the power is switched off. For those wanting to add a bit of class to their films, a realtime slow-motion effect is also available.

Included in the camcorder is a feature to eliminate unwanted noises (such as wind). It works extremely well and helps a great deal during outdoor shooting. Like the Canon, the GR-DF420 features a night-shooting mode – in this case it's called Nightscope. Moving images are captured well in low light when using Nightscope, but there's no additional LED on the front to brighten up the surroundings. Instead, the JVC makes use of its bright f1.2 lens to let in more light.

There's no DV input for transferring your movies back to the camera on this model. It's not a major problem though – some may never need to send video back to the camcorder.

The optical zoom is at the lower end of the spectrum when compared to the other models but we didn't have any issues with the image quality when shooting in full telephoto mode.

Among other items, a Scart adapter and headphones are bundled in the box. There's also a cable for employing the S-video socket hidden behind the 2.5in LCD screen.

Panasonic NV-GS21

Although it's not quite the largest camcorder reviewed, the NV-GS21 from Panasonic has a particularly stocky build and robust feel.

Flick open the LCD screen and it's ready to start shooting in just 1.3 seconds – something that's very important if you need to capture impromptu footage. A wide range of connectivity options include DV, USB and S-video. All the necessary cables are included in the box.

Image quality is on a par with all the other models here, but the viewfinder only projects images in black and white. It's not a huge blow, although a colour viewfinder does aid scene composition.

At 24x, the Panasonic can claim the largest optical zoom of the five models. When shooting in full telephoto mode we had to make use of the image stabilising feature, which

eliminated camera shake extremely well.

An LED on the front of the camera allows for shooting at night, however it's not particularly powerful. One feature that worked particularly well was Panasonic's Soft-skin mode, which enhances skin tones for a more lifelike result. A wind noise reduction tool is also included and helps block out unwanted noise when shooting outdoors.

One area where the NV-GS21 falls short is the still-image resolution. At just 320 x 240, it offers around the same image size as low-end mobile phones, which is certainly no substitute for a digital camera.

Samsung VP-D453

The VP-D453 is an attractive, compact camcorder with a good range of features. As with all the models reviewed here, overall image quality is good. We also found Samsung's menu system intuitive and easy to get to grips with. The pictures on the LCD screen look a little grainy, but the poor quality isn't carried over to the recorded video, so it's of no great concern.

A comprehensive set of connectivity options are available, including the ability to output directly to Pictbridge-enabled printers.

Just don't expect marvels from the 800 x 600 still-shot resolution.

At 360g, the VP-D453 is the lightest model here. It's also the smallest and Samsung has done a good job of squeezing additional features such as a LED and Memory Stick slot into its chassis.

Also included is some video-editing software – Sony was the only other manufacturer to follow suit. In this case it's a copy of Ulead Videostudio 7 SE. Not perhaps the most advanced of video editors, but certainly good for beginners.

The 10x optical zoom doesn't compare well with the competition. During testing we found it stopped short of the far-away detail that the Canon, Panasonic and Sony models could easily identify. It's something that will no doubt concern those wanting to film scenes from a distance, such as wildlife and sporting events.

Like the JVC, this model can be used as a 30fps (frames per second) webcam via a USB connection to a PC. Whether you'd ever put this feature to use is another matter.

Sony DCR-HC19E

Sony doesn't have a reputation for low-priced products, but the DCR-HC19E is very

competitively priced. Despite the low price, Sony has still managed to furnish it with a sturdy set of specifications that will suit most home users and it produced accurate shots in our tests. The 20x optical zoom lens is also a decent inclusion for such a low camera.

There's no LED on the front, but night scenes can be illuminated using the Nightshot Plus mode. The Sony also houses a useful integrated lens cover, so you don't have to fiddle around with a separate lens cap.

Another interesting aspect to the DCR-HC19E is the 2.5in touchscreen LCD. This proved extremely useful when trying to access settings quickly and meant less fiddling with various button combinations.

Image stabilisation is taken care of by Sony's Steady Shot technology and, like most models here, the supplied remote control can be used to operate the camcorder when it's attached to a TV. Output connections include DV, S-video, USB and AV, all of which are contained behind one plastic cover.

Sony has done a sterling job by including the Picture Package PC software, which allows you to burn your movies to DVD – a tremendously useful tool for camcorder novices.

Below: There's a large optical zoom on the Panasonic NV-GS21

Above: The Samsung VP-D453 DV has a very intuitive menu system

If you're looking for a low-cost camcorder that won't break the bank, this Sony device is definitely worth considering.

The winners

Digital camcorder technology is now so advanced, even devices at the lower end of the market will be good enough for most home users' needs. If you want a model to take home movies, all the camcorders here are capable of delivering more than adequate picture quality.

We also found most of the models available on the web for around £100 less than the manufacturers' RRPs.

Go to **www.pcw.co.uk/bestprices** for the latest deals.

Out of the five models on test, we feel two are deserving of a **Recommended** award – namely the **Canon MV850i** and the **Sony DCR-HC19E**.

Both camcorders have excellent optical zooms and a collection of additional features that just give them an edge over the others.

Sony's touchscreen LCD and uncomplicated DVD software are both handy for newcomers. In short, the DCR-HC19E really is great value for money.

Although the Canon is more expensive than the rest, its image stabilising and night mode features worked extremely well.

More importantly, both the Sony and Canon can record great-looking video, have widescreen modes and a host of manual options.

A third model that just missed out on an award is the JVC. It's a good all-round performer and, although it can't record DV footage back onto the camera, image quality is excellent.

Furthermore, the noise reduction technology is very effective and there is a good range of features.

Luke Peters

Sony's DCR-HC19Ee is a well-priced camera with lots of features

RECOMMENDED
PERSONAL COMPUTER WORLD

MANUFACTURER	CANON	JVC	PANASONIC	SAMSUNG	SONY
MODEL NAME	**MV850I**	**GR-DF420**	**NV-GS21**	**VP-D453**	**DCR-HC19E**
Price inc VAT (ex VAT)	£349 (£297.02)	£339.57 (£289)	£322.54 (£274.50)	£280.84 (£239)	£297.87 (£253.50)
Telephone	01737 220 000	0870 330 5000	0870 300 1515	0870 242 0303	020 7365 2947
URL	www.canon.co.uk	www.jvc.co.uk	www.panasonic.co.uk	www.samsung.co.uk	www.sony.co.uk
SPECIFICATION					
CCD size	1/6in	1/6in	1/6in	1/6in	1/6in
Video resolution (pixels)	800,000	800,000	800,000	800,000	800,000
Lens aperture at wide angle	f1.6	f1.2	f1.8	f1.8	f1.8
Optical zoom	22x	15x	24x	10x	20x
LED illuminator	✔	✗	✔	✔	✗
Max resolution (still shot)	1,024 x 768	1,024 x 768	320 x 240	800 x 600	1,024 x 768
LCD monitor size (in)	2.4	2.5	2.5	2.5	2.5
DV in/out	✔/✔	✔/✗	✔/✔	✔/✔	✔/✗
Manual focus	✔	✔	✔	✔	✔
Tape format	MiniDV	MiniDV	MiniDV	MiniDV	MiniDV
Outputs	AV, DV, USB	AV, DV, S-video	DV, USB2, AV, S-video	AV, DV, USB	AV, DV, S-video, USB
Card type (included memory)	SD/MMC (8MB)	SD/MMC (8MB)	SD/MMC (8MB)	Memory Stick (N/A)	N/A
Other	AV cable, shoulder strap, USB cable, widescreen lens, Scart adapter, remote control	AV cable, shoulder strap, USB cable, headphones, Scart adapter, remote control	AV cable, USB cable, power cable, remote control	AV cable, shoulder strap, USB cable, headphones, remote control	AV cable, shoulder strap, USB cable, remote control
Dimensions (w x h x d mm)	51 x 93 x 130	75 x 74 x 111	63 x 81 x 114	54 x 74.5 x 102	55 x 90 x 112
Weight (g) (without battery & cassette)	430	410	410	360	400
SCORES					
Features	★★★★☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Performance	★★★★★	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆
Value for money	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★★★
Overall	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆

Pictured left to right: Belkin Pre-N Wireless Networking, Buffalo Airstation Mimo, Linksys Wireless G XRX, and the Netgear Rangemax

MIMO ROUTERS

High-speed wireless routers

For those unwilling to wait for the next generation of wireless networking devices that comply with the 802.11n standard, a number of vendors have come up with pre-standard implementations. Based on the same Mimo (multiple input, multiple output) technology expected to underpin 802.11n, these offer both enhanced bandwidth and increased range compared to current 802.11g implementations.

On the downside, new adapters and access points/routers are required to get the full benefit, and mixing old with new can have negative effects. There's also no guarantee that any will work with 802.11n when it finally arrives (probably around 2007). Still, if it's enhanced wireless bandwidth and/or range you want, and you want it now, a Mimo router could be the answer.

Mimo enhances wireless bandwidth and range by switching the wireless signal between multiple antennas. But, with no common standard, any Mimo-based solution has to be viewed as proprietary. As such, the products on offer are all aimed at home and small-business users looking to primarily share a broadband cable or DSL Internet connection.

As a result, the current crop of Mimo solutions are all built around a wireless broadband router rather than a dedicated access point. Each router has a four-port 10/100Mbits/sec Ethernet switch built in for wired connectivity and a separate Ethernet interface for attachment of an external modem. Unfortunately, this does rule out the use of the more common USB modems currently provided free by a lot of ISPs in the UK, so in most cases you'll need to buy an Ethernet broadband modem as well.

Each model features an integrated firewall, with DMZ (demilitarised zone) and port forwarding capabilities, to secure the Internet connection, with additional content filtering and site blocking controls available on the Belkin Pre-N and Netgear Rangemax products. The Buffalo Airstation also offers an intrusion detection option.

On the wireless front, three of the products tested – from Belkin, Buffalo and Linksys – were based on the same wireless chipset by a company called Airgo. Netgear Rangemax uses Beamflex technology developed by Video54. There were three external antennas on each of the Airgo routers,

while the Rangemax housed seven internal antennas.

Despite the different chipsets, all can be used with existing 802.11b/g clients, with the usual Wep and WPA encryption for security. All claim to support a bandwidth of 108Mbits/sec when used with Mimo adapters, double the rate of standard 802.11g. Theoretical wireless rates are never anywhere near real-world throughput and these routers are no different. The best of the bunch, the Netgear Rangemax, only managed just under 40Mbits/sec. This may sound disappointing but is twice what we got when we ran the same tests on a standard 802.11g setup.

The others weren't far behind. However, when we connected ordinary 802.11g clients the throughput of the Rangemax plummeted below that of the Airgo solutions which were hardly affected at all. With the Belkin Pre-N and Linksys Wireless G SRX routers, we got the same throughput rates whether in a pure Mimo or a mixed environment.

There were also contrasting results when it came to range. Again, the Netgear appeared to be the best of the bunch, but closer examination showed this only to be true up to a point. That point

being at the range limit for standard 802.11g, beyond which the Rangemax abruptly dropped down to 802.11g speeds rather than slowly stepping down in rate as with the Airgo implementations. The best proved to be the Linksys Wireless G SRX. Although it didn't match the Netgear all the way, it was significantly better than the Belkin and Buffalo routers when used over a distance.

None of the routers we tested here were particularly difficult to configure. The Buffalo device stood out with its Airstation One-touch Secure System (AOSS), which helps simplify wireless client setup and security.

Of the four products here, the Netgear Rangemax returned some of the best results, but only when used solely with Rangemax clients. Power up a Centrino notebook nearby and a lot of the benefits could be lost.

For home use it's worth considering, but if you want to support a mix of clients the Airgo-based products are a better bet and, of the three we tested, the Linksys Wireless G SRX was the quickest and wins a Recommended award. We also found it to be the easiest of the lot to use.

Alan Stevens

MANUFACTURER	BELKIN	BUFFALO	LINKSYS	NETGEAR
MODEL NAME	PRE-N WIRELESS NETWORKING	AIRSTATION MIMO	WIRELESS G SRX	RANGEMAX
Router price inc VAT (ex VAT)	£84.99 (£72.33)	£126.80 (£107.92)	£112.29 (£95.57)	£84.99 (£72.33)
PC Card price inc VAT (ex VAT)	£61.04 (£51.95)	£70.99 (£60.41)	£71.14 (£60.55)	£49.99 (£42.54)
Telephone	00 800 223 55 460	01753 555 000	0800 068 0327	01344 397 021
URL	www.belkin.co.uk	www.buffalo-technology.com	www.linksys.com	www.netgear.co.uk
WIRELESS THROUGHPUT (MBITS/SEC)				
Pure Mimo*	35.75	37.95	37.69	39.98
Mixed wireless*	35.75	34.98	37.7	28.12
Pure Mimo at 802.11g range limit**	6.41	7.34	14.88	22.59
Score	★★★★☆	★★★★☆	★★★★★	★★★★☆

*20.56Mbits/sec at 802.11g; **1Mbit/sec at 802.11g

Epson Stylus Photo R1800

A great way to output big, quality prints

One of the advantages of owning a high-megapixel digital camera is that you can print your photos at large sizes without a reduction in quality. The Epson Stylus Photo R1800 allows you to print onto paper sizes from 10 x 15cm right up to A3+ (48 x 33cm) and it uses eight ink cartridges to do so.

Alongside the usual six colour cartridges, the R1800 uses two extra tanks – matte and gloss black. These have been designed to provide a better finish to prints used with Epson's matte and glossy photo papers. It sounds like just another marketing ploy, but the two extra inks do have an effect. Without any extra enhancement, the R1800 produced prints rich in colour with excellent skin tones and sharp detail. And print quality is difficult to fault.

Naturally, the R1800 will print borderless photos but, using the supplied attachments, it will also print to inkjet-compatible CDs and onto paper rolls, which is good for panoramic shots. In our tests, a borderless A4 glossy photo took three minutes, 10 seconds to appear, while black text emerged at four pages per minute, which makes this one of the slower printers on the market. However, if you switch off the photo settings, the R1800 will

be able to produce an A3 colour page in under a minute – good news for office workers.

The only drawback to a printer of this ilk (apart from its gigantic footprint) is the cost of ownership. At £89.66 to replace all eight ink cartridges, £24.31 for 50 sheets of A4 Premium Glossy paper and an initial outlay of £350, it's not cheap. However, photo enthusiasts will no doubt be able to justify the cost by citing its excellent print quality and large variety of paper sizes it can accommodate.

Luke Peters

DETAILS

RRP £353 (£300.42 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Epson 08702 416 900
www.epson.co.uk
SPECIFICATIONS
A3+ maximum print size • 5,760 x 1,440 optimised dpi • 8 inks • 1.5pico-litre drop size • USB2 • Firewire • 615 x 314 x 219mm (w x d x h) • 1yr warranty
PROS Amazing print quality; variety of paper types
CONS Expensive; slow when printing at high quality
VERDICT
It might be expensive, but the R1800 is one of the best large-format printers we've seen

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

MULTIFUNCTION PRINTER

Dell 1600n

Print, copy, scan and fax at a good price

Brands such as Canon, Epson and HP instantly spring to mind when you're in the market for a new printer, but in recent months Dell has been building up a range of both inkjets and lasers.

The 1600n, a multifunction workgroup device combines mono laser printing, colour scanning, standalone fax and copier functions.

One of the 1600n's major selling points is its relatively compact size. At just 457mm high and 424mm deep, it doesn't command a huge amount of space and would suit a small or home office environment.

Dell has included some rather impressive specifications considering the low price. Prints shoot out at up to 20ppm (pages per minute) in draft mode, while scans can be produced at an optical resolution of 600 x 1,200ppi (pixels per inch). What's more, the scanning quality was excellent – something you don't always see on a multifunction device. The integrated LCD screen and logical menu structure make it easy to access all its functions, but it's missing a backlit display.

As well as a standard USB2 port, the 1600n has a 10/100 Ethernet adapter, which allows it to print from any computer on the same network. It isn't possible to scan or fax over a network, though.

The low price is backed up by a reasonable total cost of ownership. The 3,000-page toner cartridge delivers prints costing just under 1.5p per page, but the 5,000-page cartridge is better value and reduces costs to just 1.05p per page.

The lack of network scanning and faxing is a shame, but Dell's 1600n is cheap to run, produces good-quality prints and has a wide range of features that will suit most small offices.

Rory Reid

DETAILS

RRP £236 (£200.85 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Dell 0870 907 5818 **www.dell.co.uk**
SPECIFICATIONS
600 x 600dpi printing • 600 x 1,200ppi 24bit scanning • 32MB of Ram • 20ppm (print and copy) • 250-sheet drawer • Multi-page Automatic Document Feeder • 15,000 pages per month duty cycle • 457 x 450 x 424mm (h x w x d) • 15.4kg
PROS Cheap; good features
CONS No network faxing or scanning
VERDICT
A good multifunction mono laser perfectly suited to small or home offices

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

PHOTO PRINTER

Canon Selphy CP600

Good value, great quality, miniature size

RECOMMENDED — PERSONAL COMPUTER WORLD

If you're in the market for a compact photo printer, there are plenty to choose from. All the major printing players offer their own spin on this gadget, including Canon, which has just updated its Selphy CP330 with the CP600.

Priced at the higher end of the spectrum for this type of printer, the CP600 prints onto 6 x 4in paper at a maximum resolution of 300dpi. It's been given an upgrade in the way of Canon's onboard Digic II processor, which allows for quicker printing and more accurate colours when used with Canon digital cameras.

However, its *piece de résistance* lies with the rechargeable battery pack, which allows printing away from a mains socket. Just attach it to a Pictbridge-compatible digital camera, a computer via USB2 (cable not supplied) or a mobile phone via infra-red and it will churn out the goods. It takes 90 seconds per photo, which is about average, but 30 seconds slower than the Dell Photo Printer 540 (see *PCW* May 2005).

The CP600 uses dye-sublimation, which means photos can be handled as soon as they are printed. Also, unlike many ink-based printers, dye-sublimation prints are more resistant to colour-fading.

Print quality is the best we've seen from a photo printer of this size, excelling in terms of colour balance and lifelike skin tones. Black areas are also very dark, rather than grey looking. A small annoyance is the over-automated software, which won't let you print a mixture of portrait and landscape images on the same print run.

The best feature is its economical printing. Although you need to stump up £200 initially, the cost per page is just 23p if you buy Canon's triple pack of three colour cartridges and 120 sheets of glossy paper.

Luke Peters

DETAILS

RRP £199.99 (£170.20 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Canon 01737 220 000
www.canon.co.uk
SPECIFICATIONS
300dpi • Digic II processor • Pictbridge compatible • 100yrs quoted photo life • USB2 • Infra-red • Auto-feed cassette • Li-ion and AC power supply
PROS Print quality; portable; cheap
CONS Expensive initial outlay; average printing speed
VERDICT
The best compact photo printer we've looked at in terms of quality and price

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★

STANDALONE PVR

Mustek DVD R580

DVD player that can record video

Mustek made its name in the scanner industry during the 1980s, but is now known for a whole range of low-cost devices, especially digital cameras. But rather than capturing still images, the latest addition to its product range can record video from just about any source to an internal 80GB hard drive or DVD. In addition, it provides personal video recorder (PVR) features similar to Sky+.

Physically, DVD R580 holds no real surprises. It resembles standard DVD players and should fit unobtrusively under your television. There's a good range of connections, including front-mounted S-video and component inputs, as well as RF, Scart, composite and component connectors at the rear. Audiophiles will also be pleased with the inclusion of digital coaxial and optical audio outputs, which produce good sound when used alongside a five-channel speaker system.

Despite its promising specifications, we occasionally found the R580 frustrating to use. Its build quality isn't bad, but the buttons at the front of the unit were sometimes unresponsive. The cooling fan is also noisy – it's by no means unbearable, but certainly much louder than Sky+ boxes.

Despite this, the R580 does a good job of recording video with no noticeable degradation in quality. The 80GB hard drive is fairly small and sufficient for only around 17 hours of video at the highest quality setting. Unfortunately it doesn't support dual-layer DVDs, so you're limited to 4.7GB per disc.

Given its price, we'd have liked the DVD R580 to have been able to wirelessly stream audio and video direct from your PC as well. Nevertheless, it's still an appealing product with a good range of features and connections.

Rory Reid

DETAILS

RRP £244.87 (£208.40 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Ebuyer **www.ebuyer.co.uk**
SPECIFICATIONS
Dual-format single-layer DVD writer • 80GB hard disk • Pal/NTSC • mpeg1/mpeg2 • 5.1 analogue and digital audio • S-video, composite, Scart, RF input/ouput • Remote control • 420 x 300 x 75mm (w x d x h) • 5kg
PROS Range of inputs/outputs; good functionality
CONS Noisy cooling; unresponsive buttons
VERDICT
The R580 has plenty of features and a huge range of connections, but it's an expensive piece of kit

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

Pinnacle Showcenter 200

The Showcenter 200 is Pinnacle's third release of its media streaming device. It's roughly half the size of the last two, but still houses a good selection of connection options such as Scart, composite and component video. 802.11g wireless is built in and a USB port now sits on the front, allowing media to be imported from a memory key.

Very little has changed in the software – a slightly updated interface is still hampered by a fiddly setup procedure. This isn't helped by an unresponsive remote control and unintuitive menu system. If you're a novice to networking, you'll struggle with the Showcenter.

Although the new design is good, we'd like to see the software given a total overhaul. But, once it's up and running, the Showcenter does a good job of streaming video, audio and images.

Will Stapley

RRP £199 (£169.36 ex VAT)
PRODUCT INFORMATION Pinnacle 01895 442 003 **www.pinnaclesys.com**
PROS Smaller design; USB port
CONS Software needs improving
★★★☆☆

Podgear Shuffle Station

With the popularity of Ipod add-ons increasing, Podgear has decided to give Ipod Shuffle owners a look-in with the release of the Shuffle Station. At just £34.99, you get both a two-speaker system and a way to charge up your Shuffle when you are away from your computer, which is only £15 more expensive than a standalone AC USB charger.

Although there's no sub-woofer, sound quality is good. It's also simple to use – just plug in your Shuffle using the supplied audio adapter and turn on the power. Its small size, plus the fact that it can be folded flat, means it is easily portable. Plugged into the mains or powered up by batteries, the Shuffle Station is well suited to those who want their music on the move.

Kathryn Twyford

RRP £34.99 (£29.78 ex VAT)
PRODUCT INFORMATION Podgear **www.podgear.net**
PROS Size; sound quality
CONS No sub-woofer
★★★★☆

NEC LCD2070NX

Whereas the NEC 1970NX fared quite poorly in our group test of 19in panels (see page 97), its bigger brother is far more impressive. The LCD2070NX is aimed at professionals who regularly perform digital image or video editing. The native resolution of 1,600 x 1,200 is ideal for such purposes and, in tests, it performed remarkably well.

Colours were accurately rendered with smooth gradients and contrast was excellent. The panel also did very well during movie and games playback with no evidence of blurring or streaking during fast-moving scenes. We'd go as far as saying the LCD2070NX is one of the best-performing TFT panels we've seen. If you want a versatile TFT display with a high resolution, it's hard to beat.

Rory Reid

RRP £522.87 (£445 ex VAT)
PRODUCT INFORMATION NEC 08701 201 160 **www.nec-mitsubishi.com**
PROS Good colour reproduction
CONS Quality doesn't come cheap
★★★★★

XFX Geforce 6800 GT

If you can't afford the top-of-the-range Gigabyte Geforce 7800 GTX reviewed on page 73, you'd be wise to consider a card based on the 6800 GT chipset. This is a cut-down version of the previous king of the Nvidia hill, the 6800 Ultra. This particular model, from gaming specialists XFX, uses a PCI Express connector, has 256MB of Ram and is otherwise configured according to the standard Nvidia reference specification. As a result, its solid 3Dmark05 score of 5,148 was in line with our expectations. In the box, XFX has included a fairly decent games bundle consisting of X2: The Threat, Commandos 3, and Moto GP. On the whole, this is a very good graphics card that most gamers should find adequate for modern 3D titles.

Rory Reid

RRP £264.32 (£224.68 ex VAT)
PRODUCT INFORMATION XFX **wwww.xfxforce.com**
PROS Fast; good value
CONS No longer cutting edge
★★★★☆

GRAPHICS CARD

Gigabyte NX78X256V-B

Ultimate performance, but for how long?

This is one of the first graphics cards to use the Geforce 7800 GTX architecture, Nvidia's latest salvo in its battle against ATI.

The NX78X256V-B doesn't look very different to its 6800-series predecessor, however, the graphics processing unit runs just 30MHz faster and the 100MHz increase in effective memory speed offers a 3.2Gbytes/sec increase in bandwidth.

Nvidia has added 80 million transistors without increasing the power requirement. The 7800 GTX also runs far quieter during non-intensive applications and occupies a single PCI Express card slot.

Other improvements include an increase in the number of pixel pipelines from 16 to 24, and vertex pipelines from six to eight. This gives the 7800 GTX the potential to process 50 per cent more pixels per clock cycle, and a far higher texture fill rate than previous Geforce cards.

All this equates to impressive performance. The 3Dmark05 result of 7,497 is the highest

we've seen. At a resolution of 1,600 x 1,200, with 4x anti aliasing and 4x anisotropic filtering, the Far Cry score was 57.64fps. This is comparable to the results achieved by a pair of Geforce 6800 Ultras using a Serial Link Interface (SLI). However, a single 7800 GTX is much less impressive in more graphically intensive games, where it can lag behind a pair of SLI 6800 Ultras by up to 20fps. As expected, the 7800 GTX can be used in an SLI configuration.

At just £60 more than a 6800 Ultra, this is great for gamers.

Rory Reid

DETAILS

RRP £386.58 (£329.04 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Scan 0870 755 4747 www.scan.co.uk
SPECIFICATIONS
430MHz core • 600MHz memory (1.2GHz effective) • PCI Express graphics bus • 256bit memory interface • 38.4Gbits/sec memory bandwidth • 10.32 billion pixels/sec • 24 pixels per clock (peak) • 400MHz Ramdacs • 2 DVI-I ports
PROS Fast; quiet; small
CONS Will soon be superseded
VERDICT
The ultimate graphics card – for the next few months at least

FEATURES ★★★★☆
PERFORMANCE ★★★★★
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

PERFORMANCE

7,497	
0 2,000 4,000 6,000 8,000	

3Dmark05*

57.64	
0 25 50 75 100	

Far Cry (fps)

* Tested at 1,024 x 768 in 32bit colour
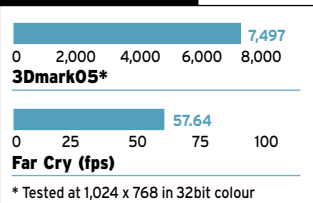
BAREBONES SMALL FORM FACTOR CASE

Aopen MZ855-II

A good basis for a diminutive quiet PC

Aopen has stuck by the SFF (small form factor) PC and pioneered the use of Pentium M processors in desktop motherboards. It therefore comes as no surprise that the latest member of its XC Cube clan, the MZ855-II, combines both technologies.

The MZ855-II is much smaller than other SFF cases and weighs just 1.85kg in its bare state. To help keep the MZ855-II as quiet as possible, an external power supply is used. The only fan in the case is the one cooling the CPU, and Aopen quotes a noise level of just 22dB when the system is working at full capacity.

Built around a Socket 479 and i855 chipset combination, it supports either 400 or 533MHz FSB Socket 479 Pentium M or Celeron M CPUs. Two Dimm slots accept DDR200, 266 or 333 up to a maximum supported memory of 2GB.

As for design, the case is finished flawlessly in piano black and Aopen even includes a cleaning cloth. Three thumbscrews hold the cover and once inside you are confronted with two plates, the larger of which holds the power module for the external supply. Once this plate is removed it's easy to access the CPU cooler, single PCI slot and, as the board uses the i855 chipset, the AGP 4x slot. Due

to the small size of the MZ855-II, any cards for these two slots need to be half-height, which are sometimes difficult to find.

The top half of the drive cage accepts a slimline, notebook-style optical drive while an ATA (there's no Serial ATA support) hard drive sits in the lower half and has rubber mounts to lessen vibration noise.

As with all XC Cubes, the MZ855-II comes with a full manual, a quick-setup poster and most of the cables you will need.

Simon Crisp

DETAILS

RRP £226.19 (£192.50 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Microdirect 0870 442 2233
www.microdirect.com
SPECIFICATIONS
Intel Socket 479 Pentium M • Intel i855GME chipset • 2 Dimm slots • AGP 4x • 1 PCI slot • 4 USB2 • 3 Firewire • 2 PS/2 • 2 S/PDIF • 2 S-Video (in and out) • 200 x 320 x 106mm (w x d x h)
PROS Ultra-small case; build quality
CONS Requires half-height expansion cards
VERDICT
The perfect choice if you want to build a small and quiet PC, but it has its limitations

FEATURES ★★★☆☆
PERFORMANCE ★★★★☆
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

▼ Sapphire Radeon X850XT Platinum Edition 256MB (AGP)

You'd think from all the hullabaloo about PCI Express that AGP is dead – far from it. There is a huge number of people who are unwilling to ditch their old motherboard for a new PCI Express version. If you are one of these and long for a high-performance AGP card, then help is at hand. Sapphire's Radeon X850XT Platinum Edition comes with the same clock speeds as its PCI Express counterpart – 540MHz core and 590MHz DDR (effective 1.18GHz) memory. Apart from the obvious interface differences between the two cards, the AGP version comes with a standard four-pin Molex power connector and DVI-I, VGA and Vivo (video-in video-out) connectors instead of the PCI Express' dual DVI-I outputs.

RRP £350.33 (£298.15 ex VAT)

PRODUCT INFORMATION
Overclock 0870 141 7161
www.overclock.co.uk

★★★★☆

▼ Aopen Aeolus PCX6800 DVD256

Aopen's latest Nvidia Nforce 6800-based graphics card is the PCX6800 DVD256. Although the card uses the Nvidia reference specs (325MHz core and 350MHz DDR – effective 700MHz), Aopen has added its own cooling solution which allows the card to be overclocked. The card has a sensor that, together with the driver software, controls the fan speed. As the core temperature increases, so does the fan speed and, with the large 7cm fan, there's plenty of cooling potential available.

The card also has Aopen's Aeolus Silentek technology, which can forecast the workload of the GPU (graphics processing unit) and adjust the fan in advance before the GPU reaches peak temperature. This helps lower both noise levels and power consumption.

There are two editions of the card – Standard and Gaming, the latter being the version supplied for review. The difference between the two versions is simply down to the games bundle supplied with the card. The Standard bundle includes Spell Force and Arx Fatalis, while the Gaming option includes Doom 3 and Call of Duty.

RRP Standard edition £233.83 (£199 ex VAT)
Gaming edition £242.05 (£206 ex VAT)

PRODUCT INFORMATION Dabs
www.dabs.com

★★★★☆

▲ FSP Green Power 400W Power Supply

When you first open the box to take a look at the Green Power PSU from FSP, you'd be forgiven for thinking it's a bog-standard power supply. The standard grey box doesn't feature any of the nylon or plastic sleeving found on other supplies to keep all the cables neat and tidy. But what makes the Green Power a little bit special is housed inside the casing. FSP claims that the supply can provide up to an 85 per cent energy saving over high-end or value supplies with power consumption dropping to as low as 1w in standby mode. It also uses a low-noise 120mm cooling fan and has been constructed following the latest EU guidelines on heavy metal use and recycling.

RRP £58.74 (£49.99 ex VAT)

PRODUCT INFORMATION Misco 0800 038 8880
www.misco.co.uk

★★★☆☆

▲ Toshiba SD-R6472 Dual Layer DVD Writer

If you fancy building a system around Aopen's latest XC Cube case, the MZ855-II (see this issue page 73), you'll be after a slimline optical drive. Toshiba's SD-R6472 should fit the bill perfectly.

This is Toshiba's first slim dual-layer burner and offers decent performance for such a small drive. It's able to burn DVD-/+ R discs at eight-speed, while DVD-/+ RW are burnt at four-speed. Dual-layer writing is performed at 2.4-speed.

RRP £83.42 (£71 ex VAT)

PRODUCT INFORMATION Worldspan **www.span.com**

★★★★☆

▼ Gigabyte G-Power Pro

Gigabyte's previous cooler, the 3D Rocket, was reasonably quiet and well received. The latest edition is the G-Power Pro. It's an unusual design with the aluminium heatsink sitting off the nickel-coated copper base by means of four heatpipes. You can use the G-Power for every desktop socket available at the moment with the exception of Socket 370.

Sitting on top of the heatsink is a large 11cm fan, which is lit by four bright blue LEDs – this G-Power is a cooler that cries out for a case with a side-panel window. The fan spins between 1,700rpm (21.3dB) at its lowest setting right up to 2,000rpm (24.5dB), which is the default setting. At this speed, the fan is able to produce an impressive 42.5cfm (cubic feet per minute) airflow.

Also included in the box are two fan speed controllers, one that sits in a PCI slot while the other is in a 3.5in drive bay. These are connected to the motherboard via the included control box.

RRP £35.19 (£29.95 ex VAT)

PRODUCT INFORMATION Overclockers 0870 443 0880

www.overclockers.co.uk

★★★★☆

▼ Acoustifan Dustproof AFDP-8025B

One of the major enemies of any fan in a PC is dust. Nine times out of 10, dust is the cause of an increase in fan noise. If the situation gets out of control, a large build-up of dust can result in total fan failure. Acoustifan's Dustproof series of fans aims to get around the problem by sealing the fan motor and therefore keeping it safe from dust.

The AFDP-8025B is an 8cm multipurpose fan which comes with a triple-speed fan cable, tie wraps and mounting screws.

RRP £14.69 (£12.50 ex VAT)

PRODUCT INFORMATION Quiet PC 0870 321 4620

www.quietpc.com/uk

★★★★☆

▲ Acoustifeet 3007 Case Feet

There's nothing more annoying than building a quiet PC but still getting a vibration noise. One cause you might not have considered is the feet on your case. It may seem trivial, but most case feet are either made of solid plastic or rubber, so any case vibration is transmitted through them. Acoustifeet are made from soft silicone which helps absorb vibration and reduce noise levels.

RRP £4.41 (£3.75 ex VAT)

PRODUCT INFORMATION Quiet PC 0870 321 4620

www.quietpc.com/uk

★★★★☆

Ulead Videostudio 9
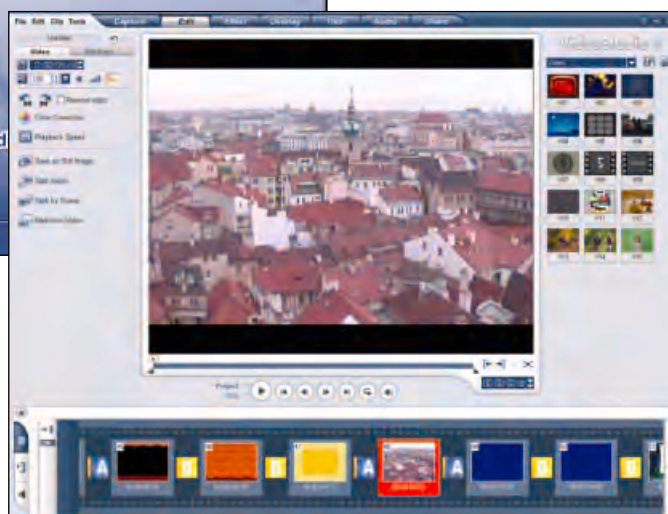
This simple yet effective package has something for every level of movie maker

RECOMMENDED
PERSONAL COMPUTER WORLD

Left: The opening splash screen helps beginners get started with simple video editing

Below: The storyboard interface and timeline are easy to navigate

When we last saw Ulead Videostudio (version 8 was reviewed in *PCW* August 2004) it was doing very well for itself. Not as complex and unwieldy as high-end video-editing programs, such as Adobe Premiere Pro or Ulead's own Media Studio Pro, but not as flimsy or basic as many other budget applications either, Ulead seemed to have the middle ground sewn up well.

A year on and, naturally, it's time to crank out a new version. But how do you improve on such a winning formula? The answer is to play it safe. Anyone expecting big changes in Videostudio 9 will be sorely disappointed. There's no gleaming new interface, no massive overhaul of functions and no revolutionary approach to video editing – just a handful of new features and a slightly improved workflow that makes the application even more accessible. Perhaps a sensible move – anything more could well have upset Videostudio's delicate balance of simplicity and power.

On the easy side of things, Videostudio provides several very useful automated features to help put together a professional-looking video in just a few clicks. In fact, the main video-editing program itself is just one of the options

presented in Videostudio's opening splash screen. The other two choices are the DV-to-DVD Wizard and the Movie Wizard. The former is a very simple way of getting your footage from tape to disc (complete with menus and titles) within two very basic steps. Movie Wizard, on the other hand, can capture and cut together a complete movie from scratch with the absolute bare minimum human intervention. What's more, it works. Any unsatisfactory moments can easily be tweaked by shifting the project into the main editing interface at any point during the process.

It's faster and easier than ever to capture footage to your hard disk. A new Quick Scan feature zips through your DV tapes at up to six times standard speed, creating a library of thumbnail photos so capture-worthy clips can be easily identified. Displaying a healthy breadth of scope, Videostudio also includes automated tools for creating

soundtrack music and photo slideshows. Ulead has even seen fit to include a handy booklet on how to shoot better video. It's not going to turn you into Martin Scorsese overnight, but the guides to framing, composition, lighting and working with audio are a welcome bonus and should help beginners to master the basics of filming on video before they even get to the editing stage.

However, Ulead isn't just catering for video virgins here. Switch from Storyboard to Timeline view and the program becomes more hands-on, providing experts with a much higher level of control over their projects. The new zoom slider is a useful addition here, allowing users to get up close to particular areas of their edit or pull back to take an overview.

In addition to an improved selection of filters and transitions, such as particle filters for rain, snow and cloud effects, Videostudio 9 also features a video distortion tool

for changing the shape of clips on screen and a new jog control for scanning through video at either high speeds or frame by frame. Of particular note is the new chroma key tool, which can create convincing blue-screen superimpositions. Somehow Videostudio manages to include these, and many other high-end features, without ever feeling too complex.

Experienced editors will probably be disappointed to learn that Videostudio still only provides two layers of video in Timeline mode. Many other video-editing programs sensibly offer 99-plus video tracks and, while it's unlikely that anyone outside of the big Hollywood cutting rooms would ever need that many, the option to build up your movie in multiple layers is often extremely useful. Ulead seems to be missing a big trick here and it's somewhat surprising it hasn't yet taken the trouble to address this issue.

Other than that, Videostudio comes up trumps in most areas. You don't need a PhD to get started, but enthusiasts will find plenty to satisfy their needs. It isn't perfect, but Videostudio is still the best budget video-editing program available.

Jonathan Parkyn

DETAILS

RRP £49.99 (£42.54 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Ulead
01327 844 880 www.ulead.co.uk
SYSTEM REQUIREMENTS
Windows 98 SE/2000/ME/XP
• Pentium III 800MHz or higher
• 256MB of Ram • 6GB hard disk
PROS Easy to use; built-in
DVD creation
CONS Still only two video tracks
VERDICT
**Simple yet thorough;
Videostudio offers plenty for
movie makers of all levels**

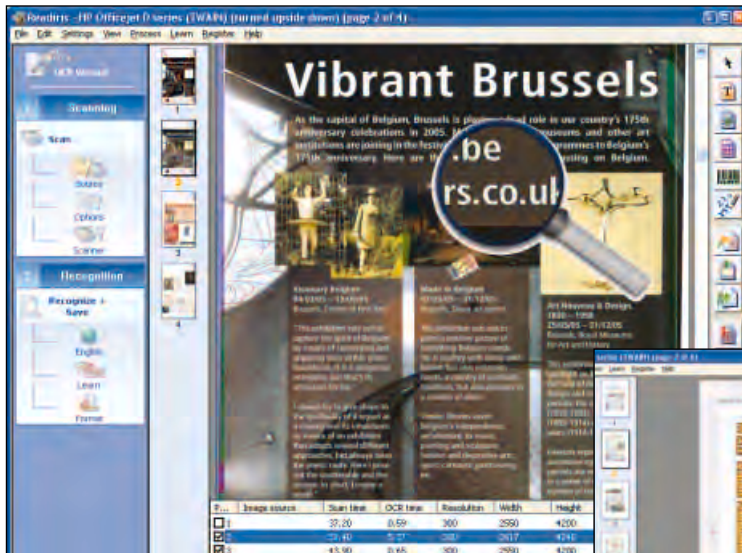|	
FEATURES	★★★★☆
EASE OF USE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

OPTICAL CHARACTER RECOGNITION

Iris Readiris Pro 10

Accurate and quick OCR, plus a host of new features, make this hard to beat

Left: Readiris Pro 10 can read text on non-white backgrounds and recognises URLs. A floating magnifier lets you check scan quality

Below: A single click option forces the program to ignore the outer borders of all scanned pages, containing unwanted material
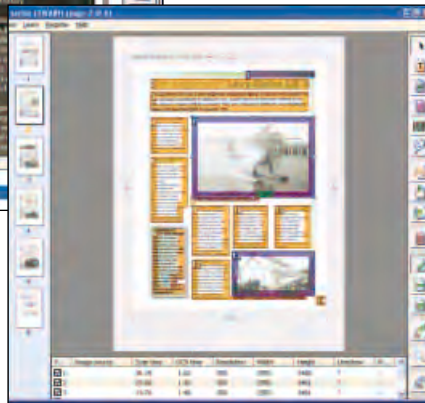
Anyone who bought an HP scanner or multifunction device recently already owns optical character recognition (OCR) software from Iris. If you want to step up from the standard package supplied by HP or any other OCR software, Readiris Pro 10 is a worthwhile upgrade.

In the past, Readiris has been known for its speed and simplicity. As well as being able to convert scanned documents into text files quickly, it has always had a minimalist user interface. Instead of pestering you with options, prompts and repetitive corrections, Readiris gets on with the job. It typically reads and converts a full-page scan of plain text in less than two seconds, providing a range of export file formats including Word, Excel and Openoffice.

Iris has reworked the spartan user interface for this release. Two sets of three icons down a left-hand pane now represent the Scanning and Recognition steps. Clicking on any of these icons calls up the relevant options for that step – either as a small pop-up list or within a dialogue window. A single column of buttons down the right-hand side provide mark-up and viewing tools for dealing with the scans shown in the central preview pane. Page scan thumbnails are shown to the left of the preview pane and individual page information given underneath.

This means you may never need to use the program menus. On the other hand, there is a sharp contrast between the cheerful icon-and-button interface and the grey, drab option windows. The huge window for specifying the text formatting and export options is very challenging, especially since your choice of export format enables and disables options without explanation. It's not possible to save custom options as re-usable selections, so if you want to switch between different text formats you must reset the options manually every time.

Readiris Pro 10 is good at retaining the original document layout, complete with text colour and all the pictures in place. However, the best results are achieved when generating Adobe pdf documents. In addition to letting you convert scans to pure text or pure image pdfs, the program now offers two combination options. One is to preserve the full page scan with fully searchable OCR text underneath, while the other is to preserve the full page scan with the text areas digitally removed from the image and replaced with real OCR text on top.

This second combination option is not only a clever example of automatic image doctoring, but it also creates pdf archives that are much clearer to read. Furthermore, Readiris Pro 10 recognises text on coloured backgrounds, even over photos. The only problem we experienced was when scanning white text on a dark background, which the program recognised correctly but then reproduced as editable text coloured black, making it illegible in the final pdf.

Impressively, Readiris Pro 10 recognises URLs within page scans, generating HTML links and pdf bookmarks automatically. It also supports several new export file formats, including WordML, Star Office 7 and Wordperfect 12. It even supports 10 more languages than the previous release, bringing the total to 117.

Automatic identification of zones has been made faster and more accurate, although these are easy to change manually. When scanning a multipage job, there is an option to ignore the border around the active page area. This ensures Readiris doesn't bother with headers and page numbers nor does it try to recognise dark edges of each scan as an image.

Despite the product offering an option that recognises text written in capitals by hand or 'handprint', we were unable to get this to work properly. Either this feature has a long way to go or we need some serious handwriting lessons.

Readiris Pro 10 also comes with tweaks to help pre-OCR scanning. You can separate multi-page scans into jobs by inserting blank sheets. There is also an automation option to trigger scans automatically, which is great if you don't own an auto document feeder.

On the whole, this is a great OCR package that includes some useful features.

Alistair Dabbs

DETAILS

RRP £104 (£88.51 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Widget UK 0845 055 0005
www.irislink.com
SYSTEM REQUIREMENTS
Windows 98/ME/XP/2000/NT
• Pentium processor • 64MB of Ram
• 120MB hard disk
PROS Fast performance; maintains original document layout
CONS Slightly awkward setup; trouble with handprint OCR
VERDICT
Readiris Pro 10 is quick and accurate and its support for export formats, especially pdf, is second to none

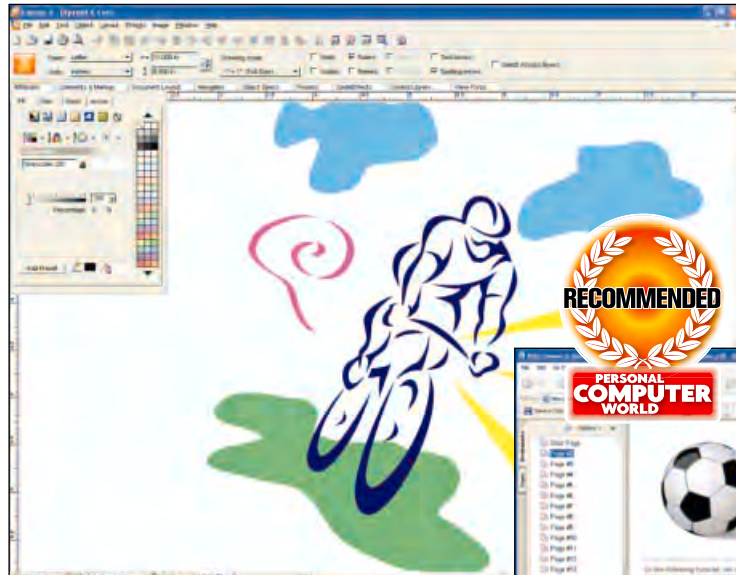**FEATURES** ★★★★☆
EASE OF USE ★★★☆☆
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

ILLUSTRATION

ACD Systems Canvas X

A versatile, all-purpose technical drawing tool and graphics studio

Left: Although it's primarily marketed as a tool for technical illustrations, Canvas is also a good general-purpose drawing and painting program

Below: The online help includes a series of 'Seven-minute solutions' that show you how to create a variety of graphics and effects

Canvas has had something of a chequered past. It started life more than a decade ago as a graphics program for the Mac, providing an unusual combination of both bitmap and vector graphics tools.

That jack-of-all-trades approach left Canvas sitting somewhat uncomfortably between more specialised programs such as Photoshop and Illustrator. As a consequence, while it always had a core of dedicated fans, it never established itself as a serious contender in the Mac graphics market. However, the move into the Windows arena provided Canvas with a lifeline, and it is now marketed primarily as a tool for creating technical drawings and illustrations.

In fact, there are now three different versions of Canvas. As well as the standard version, there are two more specialised versions aimed at the GIS (geographical information systems) and scientific markets.

We'll concentrate on the standard version though, as that's the one that has the widest appeal. The first new feature you'll come across is the Start dialogue box, which allows you to quickly launch several types of document such as illustrations, animations or page layouts. To help new users, it also provides a series of tutorials and Seven-minute solutions that show you how to create many different types of graphics and illustrations. These tutorials are all Internet-based, so if you don't have a web connection available you won't have access to this material, which is a little annoying.

Another aid for new users is the Canvas Assistant. This is a context-sensitive floating palette that can be turned on or off, depending on how much help you think you need. When activated, the Assistant displays information about any tool you select or any text or graphic element within your documents. For example, select a block of text on a page and the Assistant will display advice about editing and formatting text, as well as more complex topics.

These are welcome additions, as the sheer range of graphics tools within the program can be quite confusing for newcomers.

However, the bulk of the new features in this version are intended to make it easier to use Canvas in conjunction with other design and graphics tools. The program can now import and edit a huge range of file formats, including .dxf and .dwg files from Cad programs such as Autocad. It can also import files from Coreldraw, Visio and Powerpoint, and there's even a somewhat bizarre new option called the Canvas Printer Driver. This printer driver option can be installed onto your PC so it appears within the Print dialogue box of any Windows application. You can then tell that application to print a document to Canvas. This then turns it into a new Canvas document which can be opened and edited within the graphics program.

The idea seems to be that business users in large organisations can use Canvas as a kind of multi-purpose design tool that can be employed to gather files and material from different departments or sources. To emphasise this new collaborative focus, there are other new tools such as the Mark-Up Highlighter, which allows you to highlight parts of a document and then add annotations. The highlighter graphics and annotations are stored on a separate layer so they don't affect the underlying document. Multiple annotations can be added so several users in a workgroup can each enter their own comments.

This kind of versatility has always been Canvas' strong point, but it's not necessarily a reason to buy it. Most organisations will have already decided on a set of design tools, so it's unlikely they will flock to Canvas simply because it's so good at importing so many different file formats. It's best, then, to view Canvas as a capable tool for technical illustrations and to treat its wide-ranging file-import and collaborative features as a welcome bonus. A free trial version is available should you want to take a look before buying.

Cliff Joseph

DETAILS

RRP £185.65 (£158 ex VAT))
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Adept Scientific 01462 480 055
www.adeptscience.co.uk
SYSTEM REQUIREMENTS
Windows 2000/XP • 300MHz processor • 256MB Ram • 100MB hard disk
PROS Versatile combination of graphics tools
CONS Lacks in-depth specialist tools
VERDICT
Canvas works well as an all-purpose graphics studio and makes a good alternative to the more expensive Coreldraw Graphics Suite
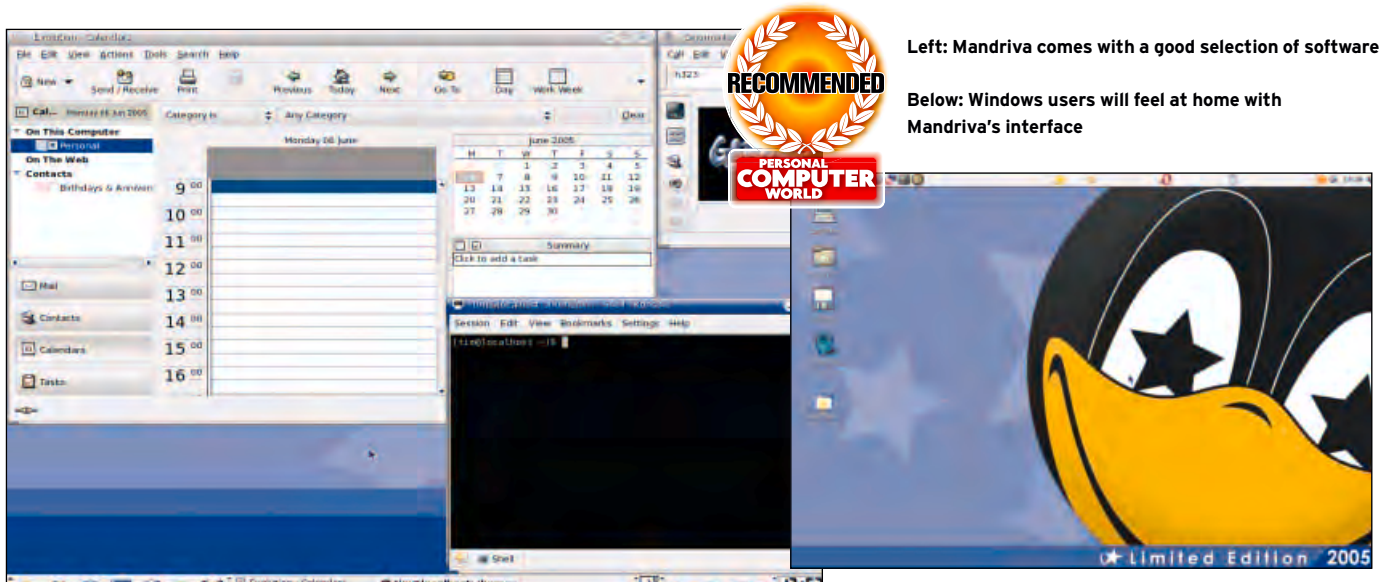
FEATURES	★★★★☆
EASE OF USE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

OPERATING SYSTEM

Mandriva Linux LE 2005

A great-value alternative to Windows that offers loads of software

RECOMMENDED

PERSONAL COMPUTER WORLD

Left: Mandriva comes with a good selection of software

Below: Windows users will feel at home with Mandriva's interface

If it sounds unfamiliar, Mandriva is the new name for Mandrake Linux. Mandriva Linux Limited Edition 2005 is the first distribution bearing this name.

LE 2005 comes with two DVDs, one for 32bit computers and one for 64bit. Installation is straightforward and we didn't experience any difficulties. The disk partitioning wizard is particularly good and features an extremely useful graphical representation of the partitions already on the disk.

Once a space has been allocated, Mandriva can create the required partitions within it – a helpful option for those who are experienced enough to want to know exactly what is going on with their hard disk, without knowing the requirements of Linux.

All hardware, such as graphics and sound, are configured and tested at this point. It's essential the correct resolution for your monitor is chosen here as it isn't possible to change it to use a higher one without returning to the installation process.

As with most Linux distributions there is a choice of desktop interfaces. Of the choices available, KDE is the most like Windows but the Gnome interface is also popular. Most applications now work in all interfaces so the decision shouldn't limit you in any way. The default login screen doesn't display users to help keep your computer secure, but this can be changed if required. This sort of flexibility is true of just about every element of the desktop in both KDE and Gnome and could leave Windows users a little bewildered with choice.

The amount of software supplied with Limited Edition 2005 may also surprise those used to being left with Wordpad and Solitaire. It's an intelligent choice of software as opposed to the ridiculous mass that used to be included with Linux distributions. Openoffice 1.1.4 is installed as default – it's not the most recent version but that's not surprising as it's still in beta testing. Openoffice can still create pdfs with a single click and Adobe Reader is there to display them. Novell Evolution fills the shoes of Microsoft Outlook and handles email, contacts and calendar tasks. There's also software included for Palm users to connect and synch with Evolution, but sadly PocketPC is not supported.

Even though some of the open-source applications are available for Windows as well as Linux, there are some that you won't find outside Mandriva.

For those who don't like the idea of kissing Microsoft goodbye completely, it is possible for Mandriva to co-exist with Windows. This can be in the form of dual booting on the same computer or over a network. Openoffice will load Microsoft Office documents and you can use the Office format by default.

In terms of file systems, Mandriva is able to read files from both Fat and NTFS partitions. However, since Microsoft hasn't released all the details of its NTFS standard, it is only possible to write to Fat drives from within Mandriva.

Despite all its flexibility, the one area where Linux looks weak compared to Windows is serious gaming. Although you'll find drivers included for most ATI and Nvidia graphics cards, there are very few mainstream games developed for Linux users. If it's to be used as a PC for homework by children, this may be a distinct advantage, although there's still a collection of puzzle games to take your mind off work.

One drawback with the LE edition of Mandriva is that there is no support included. If you want to sign up for a year's access to the Easy update system it will cost you €20 (£13 approx).

This modern Linux distribution is a far cry from the early versions. Mandriva is well suited to the Linux newcomer and the selection of software available offers far more than could be installed on a Windows-based PC. This is too good a package to relegate to a spare PC for occasional use – you won't regret making the switch.

Tim Smith

DETAILS

RRP €60 (£40 approx)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Mandriva www.mandriva.com
SYSTEM REQUIREMENTS
Pentium-based processor • 64MB of Ram • 500MB hard disk
PROS Plenty of software; good hardware support
CONS Poor games capability; limited NTFS support
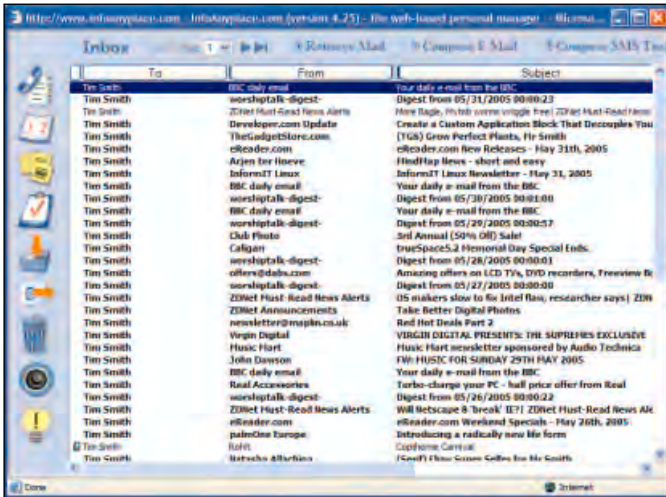**VERDICT**
An excellent Linux distribution that, apart from serious gaming, can easily replace Windows at a lower cost

FEATURES	★★★★☆
EASE OF USE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

WEB-BASED ORGANISER

Infoanyplace

Keep your contacts and files online

Collecting your email online is useful for those without portable organisers or laptops who are on the road for much of the time

I f you're often on the move, but don't have a notebook or PDA, it can be difficult to keep your personal information to hand. Infoanyplace is a web-based organiser that gives you access to data such as email and contacts, as well as storage space. All you need is access to a PC with an Internet connection.

Starting Infoanyplace is simple, with the option to import contacts and diary entries from Outlook and Outlook Express. The web-based interface looks a little plain, but is uncluttered so is easy to navigate.

You only get a single-day view on the calendar, and a three-month preview panel on the right shows appointments emboldened. There's no feature that checks for clashes with existing appointments, however. Other features include a single email inbox for all your accounts and an SMS text message service, although the latter incurs a charge depending on your subscription option.

With countless free webmail providers to choose from (some including free Pop3 email support) and plenty of online calendar services, the main attraction of Infoanyplace is the huge amount of storage space. It's worth noting that at the time of this review, the storage facility wasn't operational. Infoanyplace tells us it will be working by August, but it's worth checking before you decide to subscribe.

It's unlikely Infoanyplace will appeal to the mass market, but it's a useful service for those without a mobile computer who require access to files and information while on the move.

Tim Smith

DETAILS

RRP £38 (£32.34 ex VAT) (Other plans available)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Infoanyplace
www.infoanyplace.com
SYSTEM REQUIREMENTS
Internet Explorer 5.0 or later • Internet connection
PROS Storage; access multiple email accounts
CONS Thin on features; limited market
VERDICT
Ideal for mobile workers who can't afford hardware options or run an Exchange server, but unlikely to appeal to many

FEATURES	★★★★☆
EASE OF USE	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

PDF TOOL

Scansoft PDF Converter 3 Pro

A cheaper way to convert, edit and create

I f you use pdfs to share content-rich documents, an effective tool for creating, converting and editing them is indispensable. Adobe Acrobat Professional 7 handles all this, but the £465 price tag is high for many users.

Scansoft has a cheaper solution in PDF Converter 3 Professional, which costs just under £60. It allows you to convert pdfs into formatted Microsoft Office documents, as well as enabling the creation of pdfs from all Windows applications and providing pdf editing capabilities.

Pdf generation, conversion and editing tasks are handled by three different tools, each featuring a straightforward and clear interface. We tried out Create Assistant to make a pdf of a document containing text and graphics and it was replicated quickly and faithfully.

PDF Converter Assistant was equally simple to use and swift in operation, although the results weren't quite so accurate. It uses OCR (optical character recognition) to recognise pdfs and turn them into editable Word, Wordperfect or Rich Text documents. Our document, which contained text, graphics and a chart, was converted relatively well, although some text that should have appeared on the second page, was shifted onto a third page.

The pdf editing tool was slightly harder to use than the other two elements, but worked well once mastered. We especially liked the dashboard tool that allows you to control scroll speed and navigate through the document at the tap of a button.

All in all, it's a great budget pdf assistant.

Laura Jones

DETAILS

RRP £59.99 (£51.05 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Scansoft 01483 794 444
www.scansoft.co.uk
SYSTEM REQUIREMENTS
Windows 98SE/ME/2000/XP • Pentium processor • 128MB Ram • 140MB hard disk space
PROS Low price tag; easy to use
CONS Conversion could be a bit more accurate
VERDICT
If you regularly work with pdfs, this is the tool for the job and at just under £60 it's a bargain

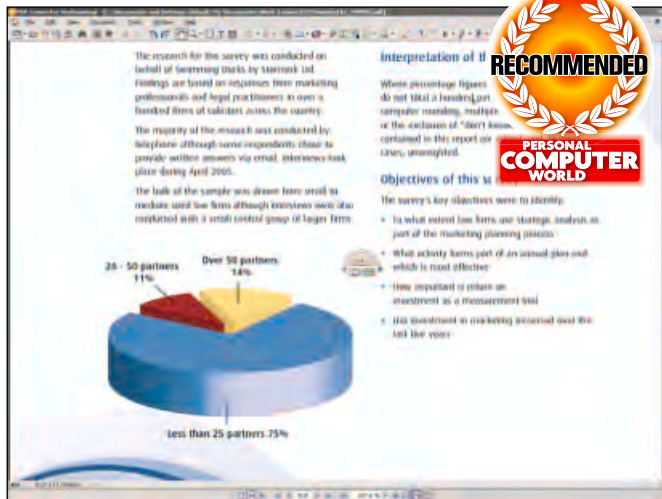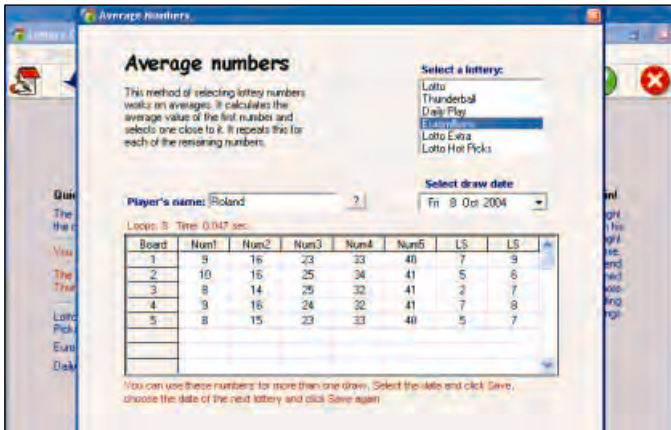| FEATURES	★★★★☆
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

A dashboard tool lets you navigate through pdfs and control scroll speed

Lottery Cracker AE

There's nothing better than winning the Lottery to solve your cashflow problems, and Lottery Cracker AE is yet another package that ignores the laws of probability. First impressions weren't good and, considering the £25 price, the interface looks incredibly amateur.

A database houses results right back to the first draw in 1994 and can be updated via the Internet. Using this data, Lottery Cracker charts information such as number frequency and will come up with suggested entries. It also helps you set up and manage a syndicate.

Considering its poor interface and limited uses, Lottery Cracker is vastly overpriced.

Will Stapley

RRP £24.95 (£21.23 ex VAT)
PRODUCT INFORMATION CCA Software **www.rawcomputing.co.uk**
PROS Helps with syndicates
CONS Poor interface; overpriced
★☆☆☆☆

O&O Defrag 8 Professional

Use your computer for any length of time and data on the hard drive will become fragmented. As a result, applications have to grab data from different areas of the disk surface, which slows down your PC. Now on version 8, O&O Defrag is a popular remedy for this problem.

The One Button Defrag feature makes it simple to use and it will immediately start defragging in the background. Various options let you tailor the defrag process and it will work with any sized drive.

As an option, whenever your screensaver is activated, the defrag process will start. When you return to your PC, defragging pauses. Defrag V8 runs on Windows XP, 2000 Pro and NT4 Workstation.

Will Stapley

RRP £50.55 (£43.02 ex VAT)
PRODUCT INFORMATION O&O **www.oo-software.com**
PROS Easy to use
CONS Expensive
★★★★☆

Maxivista 2 Professional

Like the original version of Maxivista, this new release allows users to extend their Windows desktop onto the screen of a second PC or notebook without the need for a dual-head graphics card.

You can connect up to four PCs via Ethernet, wireless Lan, Firewire or USB for a potential desktop area of up to 7,680 x 1,600. In Remote Control mode, Maxivista can be used as an alternative to a keyboard video and mouse (KVM) switch, so you can control up to four PCs with one keyboard and mouse. A minor issue was slightly jerky video playback when multiple PCs were connected via a wireless network. This is an innovative alternative to a multi-head graphics card.

Rory Reid

RRP £21.56 (£18.35 ex VAT)
PRODUCT INFORMATION Maxivista **www.maxivista.com**
PROS Easy to use; works well
CONS Slightly jerky video over wireless
★★★★★

WM Recorder

WM Recorder allows you to record streaming audio and video files from the Internet to your PC. The program works by intercepting streams sent to Windows Media Player – if you want to record a Realplayer stream, you'll need to buy RM Recorder. Both can record multimedia content in real time and high-speed URL modes, but most users will prefer the latter as you can record hour-long media streams in minutes when using a fast Internet connection.

WM Recorder is efficient and easy to use, but it raises several legal questions. Redistributing your recordings is a violation of copyright law so check the copyright details of the stream you plan to record.

Rory Reid

RRP $34.99 (£19.88 approx)
PRODUCT INFORMATION WM Recorder **www.wmrecorder.com**
PROS Works very well
CONS No file format conversion
★★★★☆

Best Buys

BEST BUY
PERSONAL COMPUTER WORLD

YOUR GUIDE TO TODAY'S TOP PRODUCTS >>

HIGH-END PC

Mesh Matrix Titan FX57 GTX
REVIEW September 2005, p55 **RRP** £1,643.83
(£1,399 ex VAT) **PRODUCT INFORMATION**
Mesh 0870 0460 4747 **www.meshcomputers.com**

Combining AMD's latest Athlon 64 FX-57 processor and Nvidia's Geforce 7800 GTX graphics card, this is a high-performance PC. Despite the impressive spec, the price tag is surprisingly low.

SLI PC

Evesham Evolution Decimator
REVIEW August 2005, p123 **RRP** £2,199
(£1,871.48 ex VAT) **PRODUCT INFORMATION**
Evesham 0870 160 9500 **www.evesham.com**

Using Nvidia's SLI Nforce 4 chipset, this PC from Evesham houses not one but two ultra-fast Gefoce 6800GTs. This is backed up by a 3.73GHz Pentium 4 Extreme Edition processor and 1GB of Ram.

BUDGET PC

Mesh Matrix Eclipse PCW
REVIEW September 2005, p112 **RRP** £799
(£680 ex VAT) **PRODUCT INFORMATION**
Mesh 0870 0460 4747 **www.meshcomputers.com**

This is one of the few budget PCs with SLI technology, so you can add a second graphics card for faster performance. It also features an Athlon 64 3500+, 512MB of Ram and 200GB storage space.

BUSINESS NOTEBOOK

Acer Travelmate 8104 WLMI
REVIEW June 2005, p104 **RRP** £1,499
(£1,276 ex VAT) **PRODUCT INFORMATION**
Acer 0870 900 2237 **www.acer.co.uk**

With a 2GHz Pentium M and 1GB of Ram, this Travelmate provides excellent performance, portability and usability. It's designed primarily for business, but has no trouble attracting home users.

TURION NOTEBOOK

Evesham Quest Roma T37
REVIEW September 2005, p56 **RRP** £899.98
(£765.94 ex VAT) **PRODUCT INFORMATION** Evesham 0870 160 9500 **www.lowestonweb.com/quest**

Battery life isn't great, but in terms of value for money the Quest Roma T37 is hard to beat. Among other features, it includes a 15.4in screen, ATI Radeon Mobility graphics and an 80GB hard drive.

DESKTOP REPLACEMENT

Mesh Pegasus 17.1in 3700+
REVIEW August 2005, p53 **RRP** £1,219.65
(£1,083 ex VAT) **PRODUCT INFORMATION**
Mesh 0870 04604747 **www.meshcomputers.com**

This features an Athlon 3700+ processor, 1GB of DDR memory and a 128MB Radeon 9700 graphics card. Combined with a 100GB hard drive and dual layer DVD rewriter, it's a great desktop replacement.

PROJECTOR

Infocus X2
REVIEW September 2004, p51 **RRP** £799
(£680 ex VAT) **PRODUCT INFORMATION**
Infocus 08000 286 470 **www.infocus.com**

It might be a bit on the heavy side, but considering the price tag of just £799, the Infocus X2 impressed us a great deal. Colours were well represented and text was superbly crisp.

PORTABLE MEDIA PLAYER

Archos AV400
REVIEW June 2005, p54 **RRP** £314.99
(£268.07 ex VAT) **PRODUCT INFORMATION**
Datamind 0870 770 0848 **www.datamind.co.uk**

Capable of playing back all manner of video and audio formats, the AV400 from Archos is also able to record video and audio directly as well as function as a fully-fledged personal video recorder.

19IN FLAT-PANEL MONITOR

CTX S966A
REVIEW September 2005, p99 **RRP** £219
(£186.38 ex VAT) **PRODUCT INFORMATION**
CTX **www.ctxeurope.com**

There's no height adjustment or DVI port on the S966A from CTX but, thanks to its great image quality, we still feel this panel is the best value-for-money 19in monitor currently available.

PDA

Palmone Zire 72
REVIEW September 2004, p106 **RRP** £199
(£170 ex VAT) **PRODUCT INFORMATION**
Palmone 0118 974 2700 **www.palmone.com/uk**

We weren't expecting much from the Zire 72, but were pleasantly surprised by its excellent picture quality, the 1.2megapixel camera and great performance.

MP3 PLAYER

Apple Ipod
REVIEW January 2005, p129 **RRP** £207.99
(£176.17 ex VAT) **PRODUCT INFORMATION**
Apple 0800 039 1010 **www.apple.com**

Easy to use and undeniably stylish, the Ipod sets the standard which all other mp3 players follow. Available in a variety of storage options, the only factor that lets it down is battery life.

MOTHERBOARD

ECS 915-A
REVIEW June 2005, p70 **RRP** £61.81
(£52.50 ex VAT) **PRODUCT INFORMATION**
ECS 0870 4000 111 **www.directfrom.com**

The Intel-based 915-A offers three types of graphics: integrated, AGP and PCI-Express. The board is well designed and allows for a wide range of upgrades. At just £61, it's a real bargain.

KEYBOARD AND MOUSE

Microsoft Optical Comfort Edition
REVIEW April 2005, p74 **RRP** £79.99 (£68.07 ex VAT)
PRODUCT INFORMATION Microsoft 0870 601 0100
www.microsoft.com/uk

This wireless keyboard from Microsoft has a comfortable ergonomic design and comes with a quick-zoom control and an impressive wireless optical mouse.

POCKET PC

T-Mobile MDA Compact
REVIEW July 2005, p67 **RRP** £209.99
(£178.71 ex VAT) **PRODUCT INFORMATION**
T-Mobile 0800 956 5001 **www.t-mobile.co.uk**

The MDA Compact offers an extra-large screen, Bluetooth connectivity and comes with Pocket versions of popular Microsoft products. A great Pocket PC and mobile phone package.

LASER PRINTER

Dell 1600n
REVIEW September 2005, p69 **RRP** £236
(£200.85 ex VAT) **PRODUCT INFORMATION**
Dell 0870 907 5818 **www.dell.co.uk**

Laser printers have plummeted in price recently, and this Dell 1600n offers scanning, faxing and mono laser printing for just £236. More importantly, both scan and print quality are excellent.

HIGH-END SPEAKERS

Creative Gigaworks S750
REVIEW April 2004, p48 **RRP** £330
(£280.77 ex VAT) **PRODUCT INFORMATION**
Creative **www.creative.com**

Coming with a wireless remote control, 210w sub-woofer and seven satellites at 70w each, these THX-certified speakers from Creative can completely immerse you in sound.

DIGITAL TUNER

Nebula Digitiv
REVIEW August 2005, p58 **RRP** £99.95
(£85.06 ex VAT) **PRODUCT INFORMATION**
Nebula 01689 897 090 **www.nebulaelectronics.com**

The Digitv is more than just a Freeview receiver for your PC. It also includes a built-in web server so you can schedule recordings remotely as well as stream broadcasts across your local network.

MULTIFUNCTION DEVICE

Brother DCP-310CN
REVIEW February 2005, p54 **RRP** £119.99
(£102.12 ex VAT) **PRODUCT INFORMATION**
Brother 0870 830 4037 **www.brother.co.uk**

Although print quality isn't the best we've seen, the DCP-310CN is a good compact all-in-one unit, has the added benefit of being able to hook up to a network and comes at a decent price.

INKJET PRINTER

Canon Pixma IP5000
REVIEW June 2005, p60 **RRP** £169
(£143.83 ex VAT) **PRODUCT INFORMATION**
Canon 08705 143 723 **www.canon.co.uk**

The new Pixma IP5000 fires out 1picolitre drops of ink, enabling it to reach new levels of detail. It takes just 35 seconds to print a 6 x 4 photo and, thanks to an extra black ink, they look great too.

SOUNDCARD

Creative Audigy 4 Pro
REVIEW July 2005, p110 **RRP** £179.99
(£153.18 ex VAT) **PRODUCT INFORMATION**
Creative **http://europe.creative.com**

The Audigy 4 Pro is an upgrade of the impressive Audigy 2 series. The main difference is the new digital to audio convertors, which provide a better signal to noise ratio. The price reflects the quality.

GRAPHICS CARD

Powercolor X850XT Platinum Edition
REVIEW July 2005, p70 **RRP** £370.07
(£314.95 ex VAT) **PRODUCT INFORMATION**
Overclockers **www.overclockers.co.uk**

This ATI card features a 540MHz core clock, 590MHz DDR memory clock and 256MB of DDR3 Ram running through a 256bit memory bus. In short, it's one of the fastest cards around.

DIGITAL VIDEO CAMERA

Canon MV850i
REVIEW September 2005, p62 **RRP** £349
(£297.02 ex VAT) **PRODUCT INFORMATION**
Canon 01737 220 000 **www.canon.co.uk**

The Canon MV850i is one of the most user-friendly camcorders we've tested. Thanks to its Easy mode, filming is hassle-free, and the quality of recordings is impressive.

DVD-RW

NEC ND-2510A
REVIEW November 2004, p75 **RRP** £49.93
(£41.91 ex VAT) **PRODUCT INFORMATION**
NEC 020 8752 3665 **www.nec.co.uk**

The NEC ND-2510A doesn't come with any bundled software or free discs, but this 8.5GB dual-layer DVD is great value for money. At under £50, it's a real steal.

OFFICE SOFTWARE

Microsoft Office Professional 2003
REVIEW May 2004, p150 **RRP** £459 (£390.64 ex VAT)
PRODUCT INFORMATION Microsoft 0870 501 0100
www.microsoft.com

This office suite offers a host of features, including a revamped version of Outlook. There are cheaper options available, but Microsoft's Office 2003 is the clear market leader.

IMAGE-EDITING SOFTWARE

Adobe Photoshop Elements 3
REVIEW January 2005, p83 **RRP** £69.33
(£59 ex VAT) **PRODUCT INFORMATION**
Adobe 020 8606 4001 **www.adobe.co.uk**

If you can't afford the full version of Photoshop, Elements 3 is a good alternative. Building on the huge success of Elements 2, it's loaded with features and is great value for money.

DIGITAL CAMERA

Nikon Coolpix S1
REVIEW August 2005, p111 **RRP** £279.99
(£238.29 ex VAT) **PRODUCT INFORMATION**
Nikon 0845 4500 155 **www.nikon.co.uk**

The Coolpix S1 is not only a very small camera, but it's also capable of taking detailed, high-quality shots. It also features a 5megapixel CCD, 3x optical zoom and comes at a decent price.

MEDIA CREATION SOFTWARE

Roxio Easy Media Creator 7.5
REVIEW July 2005, p72 **RRP** £69.99
(£59.57 ex VAT) **PRODUCT INFORMATION**
Roxio **www.roxio.co.uk**

With a wide range of audio, video, photo and DVD tools, this package represents excellent value for money and would suit those in need of a complete multimedia suite.

PC MAINTENANCE SOFTWARE

Norton Systemworks 2004
REVIEW March 2004, p68 **RRP** £64.99
(£55.31 ex VAT) **PRODUCT INFORMATION**
Symantec 01628 592 222 **www.symantec.co.uk**

If you want to keep your PC healthy and safe, Norton Systemworks 2004 certainly gets the job done, and at the reasonable price of a penny short of £65 to boot

VIDEO-EDITING SOFTWARE

Adobe Premiere Elements
REVIEW January 2005, p148 **RRP** £69.33
(£59.00 ex VAT) **PRODUCT INFORMATION**
Adobe 020 8606 4001 **www.adobe.co.uk**
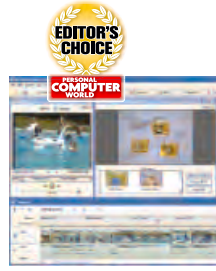
Based on Adobe Premiere, the industry standard video-editing package, Premiere Elements is perfect for home users who want to edit their videos quickly and effectively without spending a fortune.

HIGH-END DIGITAL CAMERA

Canon Powershot Pro1
REVIEW July 2004, p62 **RRP** £799
(£680 ex VAT) **PRODUCT INFORMATION**
Canon 08705 143 723 **www.canon.co.uk**

This well-designed 8megapixel prosumer digital camera is loaded with features, including a 7x optical zoom and remote control. It also takes stunning photos.

PC SECURITY SOFTWARE

Norton Internet Security 2005
REVIEW February 2005, p80 **RRP** £54.99
(£46.80 ex VAT) **PRODUCT INFORMATION**
Symantec 01628 592 222 **www.symantec.co.uk**

Providing protection from viruses, hackers and other privacy threats, as well as parental controls and anti-spam features, this is one of the best products to ensure your PC is both safe and secure.

BACKUP SOFTWARE

Roxio Backup My PC Deluxe 6
REVIEW June 2005, p82 **RRP** £34.99
(£29.78 ex VAT) **PRODUCT INFORMATION**
Roxio 01908 278100 **www.roxio.co.uk**

Take the pain out of securing the data stored on your PC. Thanks to a clean and usable interface, and the help of various wizards, Backup My PC Deluxe 6 simplifies the whole process.

MUSIC CREATION SOFTWARE

Steinberg Cubasis VST 5
REVIEW March 2004, p67 **PRICE** £59.95
(£51.02 ex VAT) **PRODUCT INFORMATION**
Pinnacle Systems **www.pinnaclesys.com**

This sound-editing tool takes a bit of getting used to, but with a huge range of plug-in effects and a decent collection of virtual instruments, you'd be hard pushed to find a better package at this price.

WORDS: RORY REID

Wifi Wonderland

Find out everything you need to know about wireless Internet access on the move, from what you need, to advice on creating your own hotspot

A few years ago, the simplest way of getting online while away from your home or office was to visit an Internet cafe. Internet providers such as Easy Everything did a booming trade in giving users web and email access, but modern times have called for a more flexible solution. With notebook PCs experiencing significant price drops and wireless networking growing in popularity, Internet cafés are no longer essential for access when travelling. Today's users demand web and email access on their own portables without the constraint of wires.

We've looked at the latest technologies in wireless networking and over the following pages we explain what hardware and software you'll need to get wire-free web access while on the road. You'll also find out the differences between wireless Internet Service Providers. For our more adventurous readers, we'll explain how to get wireless Internet access on trains, planes and even automobiles. If you run a small business or just fancy joining in at home, you can discover how to create your own wireless hotspot and share your wireless network safely. And that's not all. Read on to discover several other uses for wireless networks, such as making cheap phone calls, streaming audio and video between rooms and downloading and sharing music on the streets.

A brief history of wireless

Today, thousands of computer users enjoy wireless Internet access and the freedom of getting online when they're on the move. According to analysts Gartner, an estimated 456,000 Britons used public wireless networks last year, with the UK said to host more than a quarter of Europe's 4,100 hotspots. A hotspot is an access point in a public location, such as a café or hotel, where you can wirelessly connect to the Internet at broadband speeds.

The first attempts to provide wirefree Internet access were via the humble mobile phone. Using an ordinary cellular handset with a built-in modem, users could dial an Internet Service Provider (ISP) and connect to the web at speeds roughly equivalent to a 14.4Kbits/sec modem. General Packet Radio Services (GPRS) allowed faster connection speeds (equivalent to a 33.6Kbits/sec line) but still required a mobile phone to be linked to your notebook via a slow infra-red link or Bluetooth connection. It could also be expensive. Although you only pay for the amount of data you download, visiting a Flash-heavy website that measures only 1MB in size could cost you over £1 on some tariffs.

In the mid-1990s, a new solution was developed to tackle the issues of speed, convenience and (in theory) value. The 802.11 networking standard was developed by the Institute of Electrical and Electronics Engineers (IEEE) as an over-the-air interface between a wireless client and an access point. In essence, it served as a high-speed link between PCs, without the need for unruly network cables. The IEEE 802.11 standard was later rebranded Wifi by what is now known as the Wifi Alliance, because the term 'IEEE 802.11-compliant' was a bit long-winded. The term 'Wifi' meant nothing initially, but it sounded similar to 'hifi', which most people were familiar with. Later, the meaning 'Wireless Fidelity' was attached to Wifi as a more user-friendly way of saying a product was 802.11-compatible.

With GPRS, mobile phones allowed relatively slow Internet access

Finding a hotspot

Hotspot locations vary considerably, but many pubs and coffee shop chains now offer Wifi broadband access as a matter of course. In many big cities, finding a wireless network can be as simple as pulling out your notebook and firing up the Microsoft Zero Configuration wireless network utility. Getting out your £1,000 notebook in a public place isn't always a good idea, though, so here are some handy tips for finding a wireless network before going anywhere near your notebook's power button.

Trust Wifi Hotspot Finder NB-7300p

This compact device detects the presence of 802.11b/g networks at the press of a button. Five indicator lights show the strength of any available networks within a 150m radius. It does not, however, relay important network information such as SSID (service set identifiers), network operator and so on, and is just as likely to inform you when someone is reheating food in a microwave.
www.trust.co.uk
€29.95 (£19.84)

Netstumbler 0.4.0

Netstumbler (ideally used with a PDA) made its name approximately two years ago as the tool of choice for war drivers – people who cruise around looking for unsecured wireless networks. The utility can display the name, signal strength and security settings of all 802.11b/g networks within range, and can be connected to a GPS device to let you accurately log the location of any Wifi network it discovers.
http://netstumbler.com
Free

Ordnance Survey

Britain's national mapping agency now provides a list of Wifi hotspots on its website. It has a useful map of the UK showing exactly where users can get online. Obviously you have to be online in the first place to access it, but it is a great tool for anyone planning a trip that requires a visit to a Wifi hotspot.
www.ordnancesurvey.co.uk
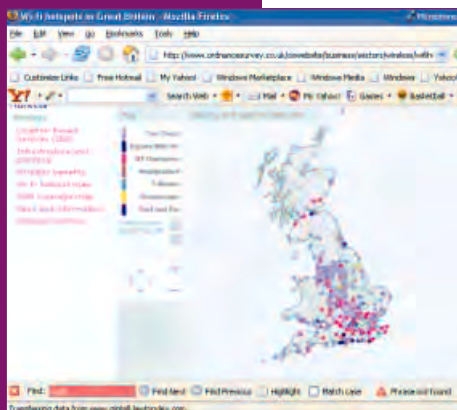
Jumping on the Wifi bandwagon

Early wireless networking could be difficult for anyone but computer experts to set up and connect to but, today, joining the ranks of Wifi Internet users is pretty easy. Most modern notebooks are shipped with some form of wireless network interface card (NIC). Many are based on the popular Centrino platform. Developed by Intel, Centrino mobile technology gives notebooks compliance with a set standard that is 100 per cent compatible with 802.11 networks. Centrino-powered notebooks are easily identified by the red and blue Centrino logo on the chassis, and use a combination of a Pentium M processor, the Intel 855 chipset and the Intel ProBG network card.

As the popularity of wireless networking has grown, so has the demand for devices with wireless networking capabilities. These days consumers are seeking products such as desktop PCs, PDAs and mobile phones with integrated wireless adapters.

Once you have the hardware, the next step is to find a location that has wireless Internet coverage. Wireless hotspots usually fall into one of two categories. The first type of hotspot is operated by a single Wireless Internet Service Provider (WISP) – usually a large telecoms company such as T-Mobile or BT. These WISPs normally provide a chain of locations (such as Starbucks coffee shops) with wireless coverage. The second type of WISP is known as a neutral network operator. These companies tend to have the widest range of locations, because they incorporate the services of multiple providers into their infrastructure. In other words, visiting a hotspot operated by a neutral network operator may give you the choice of connecting via a T-Mobile, BT Openzone or Surf & Sip hotspot in a single location. The workshop on the following page takes you through the process of logging onto a Wifi hotspot via a WISP.
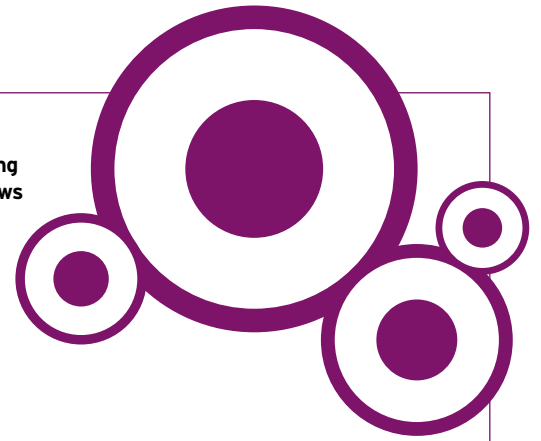
Getting online with a WISP

The process of logging onto a Wifi hotspot is very similar across most WISPs. The following guide provides step-by-step instructions for getting access on a notebook running Windows XP and Internet Explorer. If you have allowed Windows to configure your wireless network, follow the instructions below. If you are using proprietary software, either follow its instructions or go into Control Panel, click Performance and Maintenance, Administrative Tools and then Services. Scroll to Wireless Zero Configuration, double-click and ensure Startup type says Automatic and Service Status says Started.
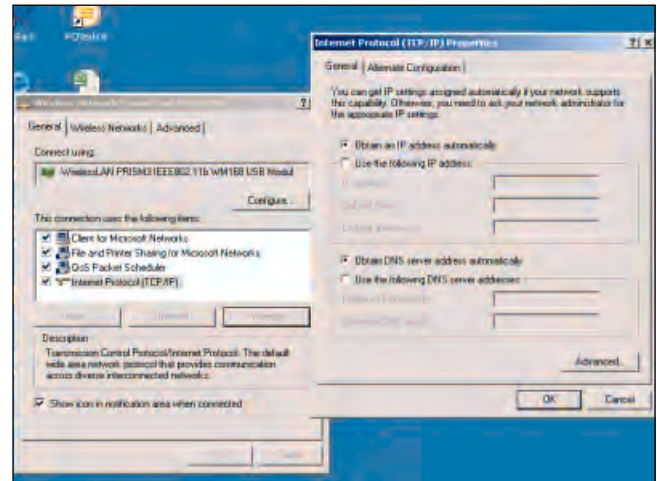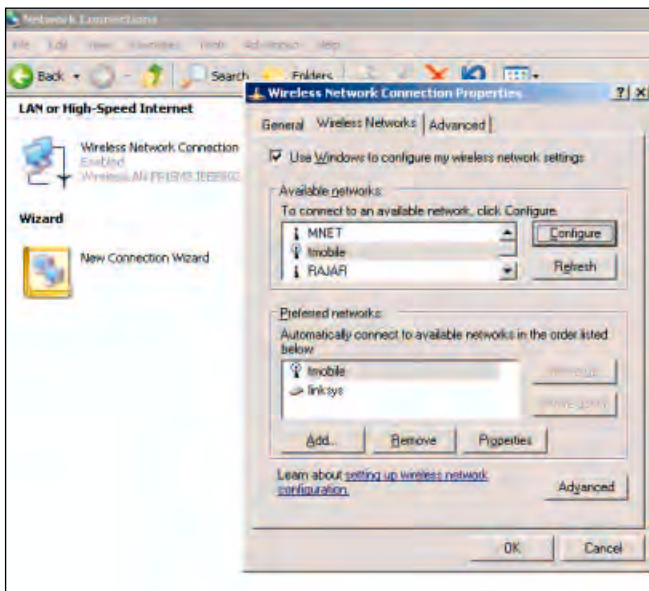
Step 1

Click the Start button followed by Control Panel. Choose Network and Internet Connections and then click Network Connections, right-click on the Wireless Network Connection icon and select Properties from the pop-up menu. Click the Wireless Network Tab. The network SSID of your nearest hotspot, such as T-Mobile, should be visible under the 'Available networks' section. Deselect the Data encryption (Wep-enabled) checkbox, then select the Advanced tab to make sure 'Access point (infrastructure) networks only' is selected.

Step 3

Open your browser and click the 'Tools' menu followed by 'Internet Options', then click the Connections tab. Click 'Lan Settings' and ensure none of the three checkboxes are selected, then click OK.

Step 2

Click on the General tab and highlight the 'Internet Protocol TCP/IP' option and click on 'Properties'. Select 'Obtain an IP address automatically' and 'Obtain DNS server address automatically', and click OK.

Step 4

Reboot your notebook if necessary in order for the changes to become effective, and you'll be ready to access the Wifi hotspot. Then start Internet Explorer and you'll be taken to a landing page where you can choose your method of payment. Once logged in, you'll be able to enjoy wireless Internet access.

persistently high-speed service that stays active even when the train enters a tunnel. Access for the entirety of the 55-minute London to Brighton journey costs £5, with no restrictions on the amount of data you can download.

A similar service is soon to launch on Virgin Trains through Orange although, at the time of writing, Wifi Internet access was only available in its first-class lounges. Great North Eastern Railway (GNER) offers Wifi access on trains with technology provided by Swedish company Icomera. Whereas the Southern Trains service operates on Wifi only, GNER's is an aggregated service that works across a range of IP infrastructures (Wifi, GPRS and 3G).

This has a couple of drawbacks; namely fluctuating network connection speeds (depending on which connection method is being used at any given time), and the need to have a wireless data card that supports both Wifi, GPRS and 3G. However, it does allow a greater number of rail routes to have Internet access. Pricing varies between £2.95 for 30 minutes access and £9.95 for three hours, but if you happen to get stuck on a section of track that only has slow GPRS connectivity, its value starts to diminish.

Broadband Wifi in airports is becoming commonplace, with most UK terminals providing web access. Connexion By Boeing (**www.connexionbyboeing.com**) is taking this a step further by allowing users to get online while in flight. Currently the service is available on Jal, Singapore Airlines and Ana Airlines between Tokyo, Singapore, London and Los Angeles, and on Lufthansa from Munich and Frankfurt to several destinations worldwide. Two pricing options are available. Unlimited use for the entire length of your trip starts from $14.95 (£8.19) for short-haul flights (up to three hours), $19.95 for medium-haul flights (three to six hours), and $29.95 for long-haul flights (over six hours). There is also a metered service with an initial charge of $7.95 or $9.95 for short or medium-haul flights respectively, with a subsequent charge of 25 cents a minute.

While planes and trains are getting in on the act of wireless Internet access, the humble automobile also looks set to benefit. T-Mobile and BT Openzone have begun to offer wireless Internet access in petrol station forecourts across the UK. These services are aimed primarily at 'road warrior' business users who are on the road more frequently than in an office. This type of user may have alternative methods of getting online or checking emails (such as a Blackberry handset), but access to wireless broadband after filling your petrol tank en route to a meeting is very appealing. What makes these hotspots most attractive is their speed – large files such as Powerpoint presentations can be transferred in a very short amount of time.

Some rather unexpected locations are now introducing wireless network access. For example, Tottenham Hotspur football club recently became the first Premiership team to offer broadband Wifi to its fans and staff. The entire ground, including the terraces, conference area and pitch, has Wifi coverage, with the idea being that fans can get online via their notebooks or PDAs to check the scores of games happening elsewhere.

Tottenham Hotspur currently charges £1.50 for 30 minutes of access time or £10 for 24 hours – although we doubt even the most ardent Spurs fan would want to hang around for a full day after any game. A full month of access can be bought for £50. Given that the stadium typically only hosts two or three home games per month, this payment option seems unlikely to catch on.

Most major cities within the UK are teeming with Wifi hotspots, but awareness of Wifi is far lower in

Internet access is now possible in many locations

T-Mobile and others are extending their hotspot services to trains

Do it anywhere

Hotspot locations vary considerably but most commonly you'll find Wifi broadband access in coffee shops and pubs, as most WISPs view these as key destinations for their target audience of business users. Although ordinary Internet cafés provide a similar service, Wifi has allowed a number of more interesting locations to supply broadband access to users on the move. The Cloud, a neutral network operator, now offers its customers wireless broadband in places where Internet access was previously unavailable. Locations include the British Library, the Royal Festival Hall and, more recently, all 85 railway stations owned by Great Western Trains.

Major developments in Wifi deployment have also enabled T-Mobile to roll out its hotspot service across Southern Trains' London to Brighton service. Not all trains were Wifi-enabled at the time of writing, but a substantial number (identifiable by clear T-Mobile branding) allow Internet upload and download speeds of up to 32Mbits/sec. Connecting to the Internet via another method (such as GPRS or, more recently, 3G), can be slow and unreliable, but the T-Mobile offering is a

smaller towns. Many organisations are working to redress this balance. Rockdirect, better known for its high-end notebook PCs, is offering unrestricted Wifi Internet access in various locations across Leamington Spa, completely free of charge.

Wifi Internet access is also cropping up in remote locations where fixed-line broadband has failed to materialise. Locust World is a small UK start-up using mesh networking to help small ISPs take on traditional telcos. Mesh technology allows a single high-capacity Internet connection (via satellite, fixed-line, and so on) to be wirelessly shared over a large area via multiple mesh boxes.

The technology is being used by various WISPs to provide rural areas with broadband access in situations where a village is too far away from a broadband exchange. Aperture Wireless Broadband (**www.dundrumbroadband.com**) now offers coverage to the town of Dundrum, Northern Ireland, an area that is devoid of fixed-line broadband access. To find out more about wireless Internet coverage in remote areas using mesh technology, visit **www.locustworld.com**.

Do it yourself

It's not just large ISPs that can create Wifi hotspots. Thanks to the low cost of wireless networking equipment, the technology is now well within the reach of the average consumer. Below are two easy methods of creating your own wireless network, and sharing files, devices or a high-speed Internet connection between several PCs.

Ad-hoc or peer-to-peer systems are the simplest form of wireless network. These allow two or more PCs to communicate without any centralised control. Setting up an ad-hoc network is fairly simple. The only hardware requirement is for each PC to have a wireless network card that uses the same protocol, such as 802.11b/g.

Most modern notebooks come preinstalled with this type of network adapter but, if not, they can easily be upgraded using a PC Card or USB dongle such as

The Netgear DG834GT router lets you create a wireless infrastructure network

Create your own hotspot with Hotspot-in-a-box

Netgear's MA111 802.11b (**www.netgear.com**). This type of network is ideal for basic users, but large ad-hoc networks can become difficult to manage, and (in cases where the network consists of only two clients) they will cease to exist if one client is switched off. But be aware that connection speeds for most ad-hoc networks is only 11Mbits/sec, even if you are using 802.11g technology (see: **http://tinyurl.com/a4mww** for an in-depth explanation).

Infrastructure networks have the same hardware requirements as an ad-hoc setup (each PC must have a compatible 802.11b/g wireless card) but, rather than access each other directly, individual clients must communicate via a wireless access point. Access points generally distribute a unique IP address for each device on the network via a Dynamic Host Configuration Protocol (DHCP) server, and ensure that your network exists regardless of whether any clients are connected.

The best method of creating a wireless hotspot is to use an infrastructure network, as they do not require any particular PC to be permanently switched on and they allow for greater security for devices that want to connect. Another major benefit is that access points can act as a bridge to extend the range of your wireless network, should you want to create a larger hotspot.

The attraction of creating an infrastructure wireless network in your home goes beyond simply having Internet access in every room. Ofcom, the regulator for the UK's communications sector, has recently made it legal to share your broadband Internet connection with other users, such as a friend or neighbour. An 802.11g infrastructure network typically has a range of up to 100m, so users could resell their Internet connection to neighbours, provided they don't violate the terms and conditions of their broadband contract (BT Business Broadband has an open policy). Anyone going down this route should, of course, use some form of network security such as Wireless Equivalency Protocol (Wep) or Wifi Protected Access (WPA), where users require a password in order to connect. You'll also have to consider the implications of someone using your broadband line for illegal activities, as you could be liable, but it is an option if you want to share the cost of your broadband connection.

While Infrastructure networks based on 802.11b/g technology are ideal for creating wireless access around the home, computer users now have the option of creating a wireless network with one of numerous so-called 'Hotspot-in-a-box' products. The Cloud (**www.thecloud.net**) operates such a service, which allows small businesses to create their own wireless hotspot using one of 20 wireless service providers. The package (available from **www.dabs.com**) consists of a wireless router and all the software you'll need to configure your hotspot. Once registered for the service, patrons visiting your business will be able to start using your hotspot via a variety of WISPs. The Cloud pays Hotspot-in-a-box sites 40 per cent of all revenue earned on a quarterly basis.

Other uses for Wifi
Cheap calls

The benefits of a Wifi network aren't strictly limited to wireless Internet access. Broadband has given rise to a number of related technologies, including Voice over IP (VoIP), which lets you make cheap phone calls routed via the Internet. Traditional VoIP setups used wired or wireless Bluetooth headsets, but the latter has limited range. Wireless networks allow the use of Wifi-ready VoIP handsets for even greater freedom.
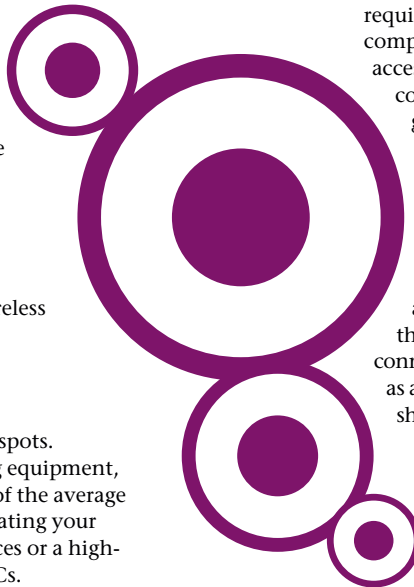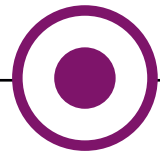
At present, these handsets aren't very popular in the UK, but there are several available to purchase via the Internet. Square7 (**www.square7.co.uk**) offers a range of Wifi-ready Session Initiation Protocol (SIP) handsets including the UT Starcom F1000. This works on the 802.11b network standard and has features such as three-way calling, call waiting and call transfer. This type of handset can be used in free Wifi hotspots such as those provided by Rockdirect, but you won't be able to connect at your local Caffé Nero, as the phone can't display the HTML form needed to register for online minutes.

You can, however, use a basic USB headset or handset for making VoIP calls via your laptop. Alternatively, in some cases, you can use a PDA and headset to make those calls. The easiest is using the Skype service. It works on your PC, laptop, PDA and Wifi-enabled phones, holds your contacts centrally and is simple to set up. One thing to be aware of, though, is that Skype for Pocket PC works only on PDAs with a fast 400MHz processor.

For users who don't want the inconvenience of carrying a SIP phone, PDA and their ordinary mobile phone, there are a number of handsets that combine all three features. The Nokia 9550 has an integrated 802.11b wireless adapter for Wifi connectivity, supports tri-band GSM for standard calls, and acts as a PDA.

Entertainment

Wifi has already made inroads into many users' home-entertainment setups, but it has also begun to creep into the realm of in-car audio. The Omnifi car stereo range from Rockford Fosgate (**www.rockfordfosgate.com**) includes a car stereo with a Wifi adapter and removable 20GB hard drive. The system can wirelessly synchronise itself with music stored on your PC. It is also compatible with the Napster music service, so you can download and transfer new tracks straight from the Internet.

Portable audio players are also set to take advantage of Wifi connectivity. The Soniquast Element Aireo (**www.soniqcast.com**) is an Internet-enabled device

Some PDAs enable you to make VoIP calls

The Element Aireo uses Wifi connectivity so you can exchange music

that allows users to exchange music between compatible players at 802.11b/g speeds, and can wirelessly synchronise itself with audio on your PC. It can also stream audio directly from the Internet. Soniqcast promises a variety of streaming content including audiobooks, magazines, newspapers and talk radio broadcasts from companies including The Discovery Channel and the BBC. The Element Aireo will be available towards the end of 2005.

More ambitious Wifi projects exist in the form of BT's 'Traffimatics' system. Currently in development, this proposed system looks at ways to send data between vehicles in a way that will benefit drivers and traffic control centres. A wireless Lan formed between cars could relay information to drivers about congestion, and the best routes to take for optimum fuel consumption. Similar systems are already in use by a small number of US police forces to provide a Wifi network at crime scenes.

The future of Wifi

Wifi is a highly useful technology in its present form, but it is set to evolve to provide even greater user benefits. While 802.11a and 802.11g Wifi bandwidth is limited to a maximum 54Mbits/sec, the upcoming 11n standard will be around 100Mbits/sec.

Additionally, the Intel-backed Wimax can theoretically achieve speeds of up to 100Mbits/sec, although the bandwidth has to be split between users in an area, so will be far less in reality. More useful though is its enormous range. Under ideal conditions, Wifi networks can generally cover hundreds of metres, but Wimax is being developed to allow Wifi-speed network connections to devices that are several miles away.

Wimax, or the 802.16e standard, is being designed to eliminate what Intel describes as the Wifi 'five-minute rule'. This states that if you live in a city, you are never more than a five-minute walk or, in a rural area, a five-minute drive from a Wifi hotspot. With Wimax Intel aims to offer the same sort of service without the need to travel.

It is set to be ratified in late 2006, with notebooks using Intel's Rosedale chip likely to be implemented in Centrino notebooks as standard. ∎
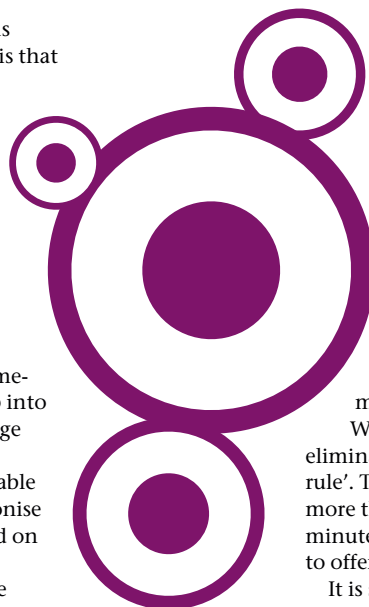
Connexion by Boeing lets users get online during a flight

Costs of Wifi

PROVIDER	T-MOBILE HOTSPOT	BT OPENZONE	SURF & SIP	O2 WLAN	FREEDOM 2 SURF
Contact	www.t-mobile.co.uk/hotspot	www.btopenzone.com	www.surfandsip.com	www.o2.co.uk/wlan	www.freedom2surf.net
Per-minute access	N/A	£35	N/A	N/A	N/A
1 hour's access	£5	£6	£5	N/A	£4.50
24 hours' access	£13	£10	£5	N/A	£15 (1 week's access)
1 month's access	£45	£40	£30	£35.25	£30

CONTENTS

Small may be beautiful for some devices, but a 19in monitor is a must for some users, especially if you have to fork out less than £400

Big screen celebrities

WORDS: PAUL MONCKTON **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

Last November we reviewed a selection of 17in thin film transistor (TFT) monitors starting at £300. Ten months on, we're bucking the inexorable trend towards miniaturisation by going bigger as well as faster. Only the prices are smaller – with these 19in models starting at a shade over £200.

There's more difference than you would expect between one 19in TFT and the next. With some manufacturers offering as many as 15 different 19in LCD monitors in their range, there's a bewildering array of features.

For office work, ergonomics such as height adjustment can be more important than cosmetic design considerations. If you're a gamer, you may value a fast response time over a wide viewing angle. For a media centre you'll want the ultimate video reproduction as well as a design that blends well into your living room.

We have tested 12 monitors that run the gamut, from corporate workhorses to those designed specifically for home users. With a range of prices to suit all budgets you're sure to find something that fits your needs. Your monitor really shouldn't be an afterthought – you spend hours looking at it and it'll probably outlive your PC, so give it the consideration it deserves. Our lab tests reveal that the highest specification doesn't always guarantee the best quality.

Winners were decided in the usual way, based on a combination of their value for money, features and performance.

Acer
AL1922HS

A subtly rounded take on the ubiquitous thin, silver bezel design, the unassuming yet elegantly understated good looks of Acer's AL1922HS belie its features and quality.

The monitor has a rare ability to deliver great-looking images in all our quality tests without any settings being adjusted.

It scores well ergonomically with a height adjustable stand that also offers tilt and swivel. Rear-mounted speakers maintain visual proportion when the screen is rotated into portrait mode.

Like other monitors here, such as Belinea's 10 19 20, the AL1922HS' control buttons are under the front bezel. Unlike the 10 19 20, its buttons are adequately spaced making it easy to operate the clear and easy-to-navigate on-screen menu.

An impressive spec boasts a 600:1 contrast ratio and a 178º viewing angle. Its 20ms response time, though slower than that of most new panels here, did not noticeably affect performance.

The AL1922HS may lack USB ports and have a slower response time than some of its competitors, but its performance and ergonomic flexibility earn it our Editor's Choice award.

DETAILS

RRP £279 (£237.45 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Acer **www.acer.co.uk**
PROS Great image quality; solid feature set; competitive price
CONS No cable management or USB ports
VERDICT
The AL1922HS offers the best balance of features, performance and price in this group, and therefore wins our Editor's Choice award

FEATURES	★★★☆☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★

Belinea
10 19 20

T he clean lines and very thin bezel of the 10 19 20 make it ideal for multiple monitor setups and its concealed control buttons and speakers ensure the symmetrical shape preserves its good looks when in portrait mode. The stand tilts, swivels, and is height-adjustable with integrated cable management.

Suited to portrait mode is the monitor's very wide 178º viewing angle, in both horizontal and vertical directions. Achieving top marks in two out of three of our viewing panel tests and scoring very highly in the other, the 10 19 20 stands out as a great performer. Unfortunately, wide viewing angles are not always compatible with the fastest response times and, at 25ms, this is joint slowest.

It's a shame that a monitor as well designed as this is let down in two areas: the control buttons are so well concealed and have such a low profile that correctly locating them is a rather clumsy affair and activating them can cause the whole monitor to wobble. The on-screen menu is also disappointing.

Overall, the 10 19 20 offers a good set of features and combines these with great image quality and good design.

DETAILS

RRP £287.88 (£245 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Belinea **www.belinea.co.uk**
PROS Excellent image quality; thin bezel and rotating screen
CONS Control buttons; 25ms response time
VERDICT
Gamers may spurn the 25ms response time, but the 10 19 20 offers great performance. Its thin bezel and wide viewing angle make it ideal for use in portrait mode

FEATURES	★★★☆☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

Benq
FP937s

T he cheapest of all the monitors submitted for review, Benq's FP937s only narrowly misses out on a Highly Commended award.

The FP937s is a rather pleasing take on the thin-silver-bezel-on-black-stand design. It has a 'brushed' finish and discreet front-mounted buttons with a positive, unambiguous action. The on-screen menu, while not exactly pretty, is very clear and easy to use and a separate 'i-key', Benq's term for an auto setup button, makes for easy configuration without having to enter the menu system.

There are no special functions and no facilities such as USB, speakers or pivot. While none of the monitors here are bad, the FP397s comes joint bottom in our still image quality tests, despite outgunning CTX's high-scoring S966A on specification.

Its features are competitive: a 12ms response time, 500:1 contrast ratio, 250cd/m² brightness, sRGB mode and dual inputs are great at this price, although its 140º viewing angle is rather disappointing.

This is a no-frills entry-level product built on up-to-date technology. If you want a DVI input, this monitor is £55 cheaper than its nearest rival and great value for money.

DETAILS

RRP £210.33 (£179 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Benq **www.benq.co.uk**
PROS Very low price; dual inputs
CONS No height adjustment or speakers
VERDICT
If you're on a tight budget, it's a choice between the Benq FP937s and the CTX S966A. On paper, the Benq monitor has the edge with the advantage of a DVI input, but the S966A wins on image quality

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★☆☆

CTX
S966A

The S966A is a surprisingly attractive monitor when you consider that it comes from CTX's budget S-Series range of panels. Its silver and black casing is a match on style for any of the other monitors here. A pair of stereo speakers causes minimum visual impact and a convenient carrying handle is also built into the design.

A 450:1 contrast ratio, captive VGA cable (no digital connection is provided) and 140º x 130º viewing angle combine to give this monitor the poorest spec we tested. The stand offers only basic tilt adjustment, although CTX does sell an optional stand with a full range of movement.

Despite this, the S966A turned in a highly creditable performance in our viewing tests, achieving full marks for its display of video and smoothness of gradation. It didn't fare quite so well on Displaymate's tricky 'colour bar' test, let down by its relatively poor viewing angle and contrast ratio, but it still managed to beat four other monitors convincingly.

At nearly £150 cheaper than the Philips 190P6, the S966A is an excellent deal in terms of both looks and performance and earns a Highly Commended award.

DETAILS

RRP £219 (£186.38 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
CTX **www.ctxeurope.com**
PROS Looks more expensive than it is; great image quality; price
CONS No height adjustment or DVI input, restricted viewing angle
VERDICT
Excellent value for money; Benq's FP937s edges ahead on spec and price, but this CTX wins on performance and build quality

FEATURES	★★☆☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

LG
Flatron L1950

The ultra-thin bezel of the LG Flatron L1950 makes it ideal for multi-monitor setups as well as giving the illusion of having a bigger screen. Its brushed silver finish and bold, angular corners give it a very modern look.

The on-screen menu is one of the better-looking ones we've seen and is clearly laid out. It's a shame the tiny control buttons are so 'plasticky' as they cheapen the appearance of what is otherwise a very well-designed monitor.

The menu is simple to use and, unlike so many others, pleasing to the eye. An auto setup button is provided, along with a 'lightview' function which allows you to switch between preset configurations such as day and night settings with a single press.

Our viewing panel placed the L1950 in the middle of the pack for image quality and its specs tell a similar story: its solid 250cd/m^2 brightness, 500:1 contrast ratio, 160º viewing angle and 12ms response times neither delight nor disappoint. It has tilt, swivel and is height-adjustable but offers no USB or audio capability.

The L1950 is just one of 15 19in TFTs in LG's range, so if you like the style, there are plenty of variations.

DETAILS

RRP £279 (237.45 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
LG **http://uk.lge.com**
PROS Brightness presets; height adjustment; clear on-screen menu
CONS Ugly control buttons; no speakers or USB ports
VERDICT
A good monitor, but for the same price you could have the more stylish Sony HS95 or the better-performing Acer

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

NEC Multisync
LCD1970NX

NEC's Multisync LCD1970NX is very similar in specification to Belinea's 10 19 20. Both offer the slowest pixel response time here of 25ms, but counter this with a very wide viewing angle which, to most users, will be a more important consideration.

Its familiar-looking silver bezel is tempered by rather softer edges and a grey, rather than black or silver, case and stand. Other than rotation, a full range of stand adjustments is provided along with an effective cable management system to keep your desk tidy and ensure the monitor looks good from the back as well as the front.

Control buttons and, uniquely, a small joystick hang below the bezel, providing access to a colourful on-screen menu with large clear type. We found the joystick rather tricky to use accurately but thankfully NEC's Naviset software lets you control monitor setup directly from the PC.

Designed for business use the LCD1970NX offers a very wide 176º viewing angle. It also supports network-based asset management.

The rather high price may put many users off, but if the design appeals, consider the similar 1970V for around £50 less.

DETAILS

RRP £327.83 (£279 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
NEC **www.nec-display-solutions.co.uk**
PROS Good cable management; wide viewing angle; height adjustment
CONS Fiddly joystick control; slow response time
VERDICT
The NEC Multisync LCD1970 is well built and offers good performance and features but the price is a little too high

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

Neovo M-19

One glance at the M-19 shows that Neovo has gambled the success of this product on you liking its highly unconventional design. Renouncing the familiar pedestal and stand, the M-19 sits on the desk like a large table-top picture frame. Its silver-grey bezel appears encased asymmetrically in a clear plastic surround, one side of which houses clear plastic buttons for auto setup and a selection of brightness presets.

On entering the on-screen menu (activated by the power button) you're greeted by an animated display almost worthy of a Pacman-style game. Holding down the power button until the completion of a countdown timer provides the control's usual function.

Well equipped with a 12ms response time, dual inputs, a USB hub and integrated audio, the M-19 is let down mainly by its restricted viewing angle and the lack of ergonomic stand adjustments.

In our Lab it scored top marks for video and a very commendable result in the Displaymate colour test.

If you want something really different, and you're prepared to pay £300 for it, the Neovo M-19 will certainly deliver.

DETAILS

RRP £299.99 (£255.31 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Neovo **www.neovouk.com**
PROS Integral speakers and USB hub; very unusual design
CONS Minimal stand adjustment; bizarre animated control menu
VERDICT
This is a monitor you will or will not buy primarily because of its design. Its image quality is high, but so is the price

FEATURES	★★☆☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

Philips Brilliance 190P6

Philips' top-of-the-range TFT monitor is the most expensive in this test. Coming from the business range rather than the consumer, it's packed with high-end features but is sadly lacking in the style department.

Our review sample was the only monitor in this test to be supplied in standard office mushroom white making it seem rather outdated. This is a shame because the build quality is excellent, as is its range of ergonomic adjustments. It can tilt, swivel and rotate and comes with a wide height adjustment. It has built-in speakers and even a four-port USB hub. It's also the only monitor here to offer a Class I panel, which means zero pixel defects – guaranteed.

Although the 190P6 didn't fare too well in our viewing panel tests the image quality was acceptable. It's important to note that these tests did not take advantage of features such as 'Lightframe Digital Reality' which allows the monitor to improve brightness, contrast and sharpness in specific areas of the screen. It can also control the screen brightness automatically to suit ambient lighting conditions.

A silver version of the 190P6 is available, or you could consider the stylish 190X5B.

DETAILS

RRP £365 (£310.64 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Philips **www.philips.co.uk**
PROS Highly adjustable stand; Class I panel; 4 USB ports
CONS Looks old-fashioned; expensive
VERDICT
This has the richest feature set, including Lightframe image processing technology and network asset management. However its price is far too high for most users

FEATURES	★★★★★
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

Samsung Syncmaster 913N

Samsung's 913N costs just £10 more than the CTX S966A, which is the second cheapest monitor here. Both offer just the basic tilting stand and neither is fitted with DVI connectors. However the 913N has the higher spec with an 8ms response time, 700:1 contrast ratio and 300cd/m^2 brightness, plus a superior 160° viewing angle. It also achieves the stricter TCO 03 certification (see box p102).

Despite its on-paper advantage, the 913N was narrowly beaten by the S966A in our subjective quality tests, losing one point for video quality but remaining half a point ahead on our Displaymate test.

The control buttons blend into the design of the silver bezel and offer entry into a clear and easy-to-navigate on-screen menu. A discreet 'auto' button assists quick setup and a Magicbright control lets you select from a choice of four brightness presets. Magictune software allows you to carry out all picture adjustments from your PC without having to use the on-screen menu.

The stand, while simple, is cleverly designed to allow you to pass cables through it and keep your desktop tidy. The Syncmaster 913N is excellent value for money and a great budget purchase.

DETAILS

RRP £229.13 (£195 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Samsung **www.samsung.co.uk**
PROS Lowest-priced 8ms panel in this group test; good looks; very high contrast ratio
CONS No DVI input, speakers or USB ports
VERDICT
At this price, this Samsung monitor provides a great combination of features and quality

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

Sharp
LL-193A-B

A good performer with a fast 8ms response time, the Sharp LL-193A-B looks impressive. Clad in black from head to toe, its thin bezel and tidy control buttons exude quality without the need for flashy design flourishes.

A pair of speakers is tucked away neatly out of sight with a convenient front-facing headphone socket above a basic, tilt-only stand, which is sturdy enough but lacks any form of cable management, causing it to look somewhat untidy from the rear.

The on-screen menu is simple to operate and separate auto and preset buttons let you set up and configure the monitor quickly for a variety of viewing situations.

Uncalibrated, the LL-193A-B didn't fare too well in our Displaymate colour tests but made a strong recovery with its results in the greyscale and photo/video tests, placing it in the middle of the pack overall.

The LL-193A-B adds audio and sRGB colour matching to the specification of its nearest rival Samsung's Syncmaster 913N but the additional premium of £90 inc VAT is a lot to ask for these features. At this price we would have expected at least a DVI input and a height-adjustable stand for ergonomic use in the workplace.

DETAILS

RRP £319.48 (£271.90 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Sharp **www.sharp.co.uk**
PROS Built-in audio; 8ms response time
CONS No DVI input; pricey
VERDICT
Sharp's LL-193A is good but simply too expensive for a monitor that lacks DVI input. Compared with Samsung's Syncmaster 913N that costs £90 less Sharp's offering is expensive

FEATURES	★★☆☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

Sony
SDM-HS95

O ne of the most eye-catching monitors here is Sony's SDM-HS95, HS standing for home series. Available in both black and silver, its Rising Design styling is aimed at home and image-conscious office users. Tilt adjustments are easy, but the pedestal-free design precludes ergonomic features such as swivel or height adjustments which many users may want.

We found image quality to be variable. Although our testers were unimpressed with the Displaymate tests, our high-definition video clips were reproduced with excellent results – especially with skin tones which appeared more natural than rivals. At home, this alone could be a reason to choose the panel above any other.

The on-screen menu, while reasonably clear and easy to use, was occasionally confusing. It includes options such as gamma1 and gamma2, with no explanation to help users. There are backlight brightness presets, but manually setting the backlight to maximum strangely resulted in a much dimmer light than when in the high mode.

This is a great choice for those who want a stylish and distinctive monitor, especially in multimedia applications.

DETAILS

RRP £279 (£237.45 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Sony **www.sony.co.uk**
PROS Distinctive styling; excellent video quality
CONS Only tilt adjustment available; no speakers or USB
VERDICT
If you want your monitor to blend in with your home environment, the SDM-HS95 looks the least like computer hardware while delivering competitive performance

FEATURES	★★☆☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Viewsonic
VX912

V iewsonic's VX912 is sturdy yet elegant in black and silver. It has the feel of high build quality and a design that would look good at home or in the office. Its front-facing silver control buttons look metallic rather than plastic and complement its overall appearance.

Under the covers is an 8ms panel with a high 500:1 contrast ratio and 270cd/m² brightness. However, this comes at the expense of viewing angle, which along with CTX's S966A is the lowest in the group at 140° horizontal by 130°. But Viewsonic exceeds the ISO Class II specification for pixel defects by guaranteeing that only sub-pixel errors will be tolerated rather than whole pixels being either bright or dark.

Although all the monitors here would work well for desktop office applications, the VX912 scored equal lowest in our movie/photo subjective quality tests.

No swivel, rotation or height adjustment is available, leaving only a modest tilt facility. No USB ports or speakers are included. Cables are kept tidy by a removable rear panel.

The VX912 represents reasonable value for money, but is bettered in this department by the likes of CTX and Samsung.

DETAILS

RRP £265.26 (£225.75 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Viewsonic **www.viewsonic.co.uk**
PROS Build quality; enhanced pixel guarantee; 8ms response time
CONS No auto button; no speakers or USB
VERDICT
A good-looking, well-built monitor that costs slightly more than the budget models here. But it's the cheapest panel with both an 8ms response time and a DVI input

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Colour management explained

We use a vast vocabulary of terms to describe colour, none of which can be easily understood by a computer. Your monitor creates colours by combining different levels of red, green and blue light, but they may not be the same red, green and blue used by someone else's monitor, scanner or digital camera. Unfortunately, spotting when something is wrong is easier than getting it right.

Without going into too much detail, here are some steps you can take if your photos are coming out olive-brown or pillar-box pink.

At this point you have a choice. Depending on how much accurate colour matters to you, you can achieve a considerable improvement for free or spend some money on a hardware calibration system for professional-level results.

The first two tips below apply to everybody:

1 Make sure your graphics card is configured for at least 24bit colour. To faithfully reproduce a full-colour image, you'll need all those bits working.

2 Position your monitor away from bright lights and reflections. Lamps and lights not only create unpleasant glare and reflections, but they're also a different colour to the white light coming from your monitor.

3 If your monitor comes with a driver, install it. This will often install an International Color Consortium (ICC) profile which describes to the system the red, green and blue colours used by your monitor as well as the way they change from dark to light. This is known as gamma. It also precisely describes the colour of white used by the monitor.

4 Set up your brightness and contrast controls properly. Set the contrast to maximum and lower the brightness until the darkest grey is barely distinguishable from black. If necessary, lower the contrast setting until the lightest greys can just be distinguished from white.

You will probably need some sort of test image to help you do this. These come with most image manipulation programs and are widely available on the Internet.

The ICC profile is generic, designed to work for all monitors. In reality, monitors of the same make and model vary considerably and change over time and with the components' age. Generic profiles rarely have instructions on how to set up the colour modes on your monitor. With any luck, they'll be a step in the right direction.

If you have no ICC profile, look for an sRGB mode. In Windows and on the web, sRGB is the assumed profile when none is present. Many, though not all, implementations of sRGB also lock down the brightness and contrast controls meaning you can skip step 3 above.

Possibly the most important thing to get right is your display's gamma. A graphics card outputs varying voltages signifying different levels of brightness. However, due to the non-linear relationship between them, a doubling in voltage does not equal a doubling in brightness. The factor determining this relationship is gamma. Different monitors have different gammas and your red, green and blue primary colours may have different gammas.

The simplest way to ensure a correct gamma setting is to use a tool such as quickgamma.

Useful links: Quickgamma **http://quickgamma.de/indexen.html**
Colour management **www.normankoren.com**

What to look for when buying

Everyone has an opinion on what the best type of monitor is, but in reality it comes down to what you like the look of – there's no substitute for seeing a monitor in operation before you buy it. CRT (cathode-ray tube) monitors have gone out of fashion recently, mainly due to the rapidly dropping prices of TFT (thin-film transistor) flat-panel models. CRTs are bulky, heavy and power-hungry, but they are now excellent value for money. Below are few things to bear in mind when you're buying a monitor.

Resolution is the number of graphics elements displayed on a screen. Known as pixels, they are generated by your graphics card. In any TFT, each pixel is composed of three sub-pixels coloured red, green and blue. In a CRT the pixels are spread in a grid across the screen separated by a distance called the dot pitch. The smaller the dot pitch, the sharper the image. With TFTs, the number of pixels equals the 'native' resolution; a 1,024 x 768 TFT will have exactly that number of pixels horizontally and vertically. Running a TFT below its native resolution can result in either a poor 'blocky' picture or one that doesn't fill the whole screen.

TFTs are stylish, compact and easy to move around, but there is a lot of misinformation so you need to check the specifications of the model you choose closely.

Check the native resolution is sufficient for your needs. For example, gamers wanting to run 1,600 x 1,200 will probably need an expensive 20in model – most 19in panels are currently limited to 1,280 x 1,024 and budget 14/15in models might only support 800 x 600.

Modern TFTs can be viewed from a wide range of angles vertically and horizontally, but anything over +/- 45º doesn't make any difference in normal use.

Response time is the time taken for a pixel to turn on and off (see box on page 106). Newer monitors have response times as low as 4ms, but the average user won't notice much benefit below 25ms.

TFTs have high quoted contrast ratios, but evenness of lighting is more important than the overall brightness specification – but you can only tell this from looking at the monitor.

The ISO 13406-2 standard specifies minimum requirements for display contrast, viewing angle, brightness, reflections, flicker, contrast and defective pixels. You may see the standard incorporated in a TUV label with the words 'Ergonomics Approved' or 'ISO 13406-certified'. The TCO 95 and 03 standards cover electromagnetic emissions, noise and ergonomics – ensure the monitor has at least one of these approvals. ISO 13406-2 includes stringent standards for defective pixels. Only Class I TFTs are guaranteed no defective pixels – most consumer models are Class II.

Lab results

vnu labs

Movie/photo viewing panel test

Monitor	Score
CTX S966A	HIGHLY COMMENDED 10
Neovo M-19	10
Sony SDM-HS95	10
Acer AL1922HS	EDITOR'S CHOICE 10
Samsung Syncmaster 913N	HIGHLY COMMENDED 9
Belinea 10 19 20	8
Philips Brilliance 190P6	8
Benq FP937s	8
Sharp LL-193A-B	8
LG Flatron L1950	8
Viewsonic VX912	7
NEC Multisync LCD1970NX	7

BIGGER IS BETTER — 0 2 4 6 8 10
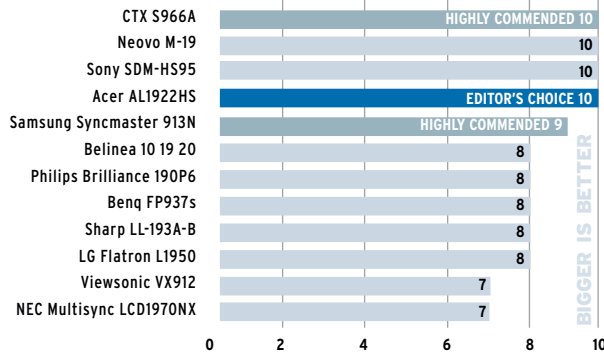
Displaymate viewing panel test

Monitor	Score
Belinea 10 19 20	10
Acer AL1922HS	EDITOR'S CHOICE 10
Neovo M-19	8
Samsung Syncmaster 913N	HIGHLY COMMENDED 7
Philips Brilliance 190P6	7
LG Flatron L1950	7
CTX S966A	HIGHLY COMMENDED 6.5
NEC Multisync LCD1970NX	6
Viewsonic VX912	5
Sharp LL-193A-B	4.5
Sony SDM-HS95	4
Benq FP937s	3

BIGGER IS BETTER — 0 2 4 6 8 10

Greyscale viewing panel test

Monitor	Score
Belinea 10 19 20	10
Acer AL1922HS	EDITOR'S CHOICE 10
Neovo M-19	8
Samsung Syncmaster 913N	HIGHLY COMMENDED 7
Philips Brilliance 190P6	7
LG Flatron L1950	7
CTX S966A	HIGHLY COMMENDED 6.5
NEC Multisync LCD1970NX	6
Viewsonic VX912	5
Sharp LL-193A-B	4.5
Sony SDM-HS95	4
Benq FP937s	3

BIGGER IS BETTER — 0 2 4 6 8 10

Measured power comsumption (w)

Monitor	Watts
Belinea 10 19 20	30
LG Flatron L1950	30
Samsung Syncmaster 913N	HIGHLY COMMENDED 30
Sharp LL-193A-B	30
Sony SDM-HS95	30
Benq FP937s	31
Acer AL1922HS	EDITOR'S CHOICE 32
Viewsonic VX912	32
CTX S966A	HIGHLY COMMENDED 32.5
Neovo M-19	34
NEC Multisync LCD1970NX	36.5
Philips Brilliance 190P6	36.5

SMALLER IS BETTER — 0 10 20 30 40

How we tested the monitors

Our tests each require different monitor configurations to allow them to perform at their best. For a fair test, we set each panel to its native colour temperature, ensuring the maximum range of colours was displayed. Choosing a preset colour temperature, such as 9,300K or 6,500K, may produce a colour balance you prefer, but it will result in some reduction in the range of displayable colours and the accuracy of greyscale reproduction, especially at the very light end of the scale.

Our subjective viewing panel tests (see below) were conducted under our normal Labs lighting: a standard D50 illuminant, which is equivalent to daylight. Using two high-quality Scene Double SD4+4x video splitters plugged into a dual-head video card on the master PC, all monitors were lined up simultaneously for comparison. Test screens were provided by running Displaymate monitor testing software.
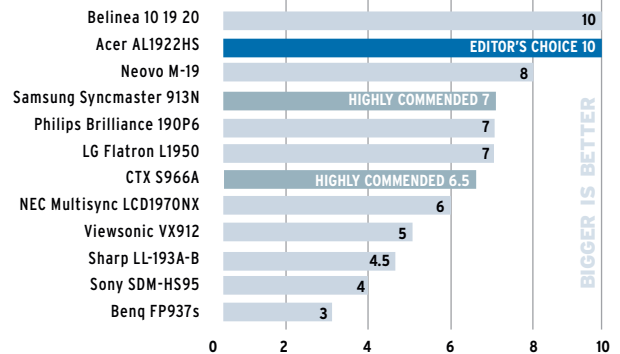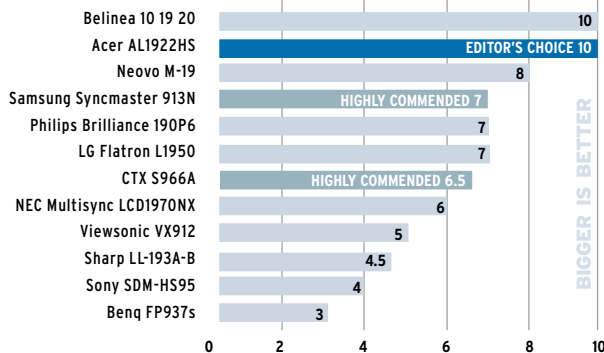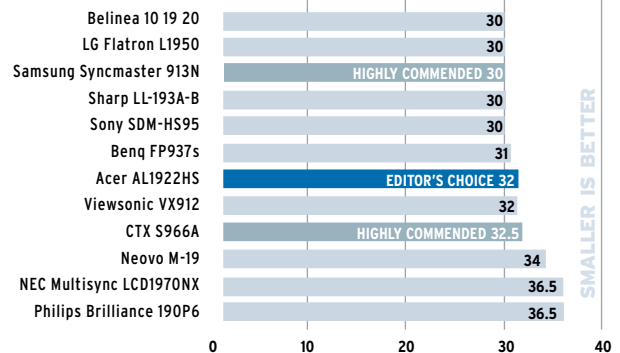
While in this configuration, we calibrated the monitors using a Pantone Colorvision Spyder2PRO. This not only allows us to see them operating at their best, but also produces graphs that allow us to evaluate their response curves for accuracy and smoothness.

For viewing sRGB photos and high-definition video, we reconfigured the panels to use sRGB colour modes and movie presets where available otherwise we selected a colour temperature of 6,500K.

This screen displays 25 intensity levels for each of 10 principal colours. You can see how the colour scales reproduce on your display. This is important for mixing, matching and specifying colours as well as displaying photo images

Viewing panel tests

Our subjective tests were done using a viewing panel consisting of *PCW* editorial staff. In each test, the panel first judged individually what they considered the best and worst performers in each quality test then arranged the rest in order from best to worst. We gave the overall top scorer 10 points then scored the remaining products relative to this.

The Displaymate (**www.displaymate.com**) tests comprised a selection of test patterns, but we found that the most important differences were evident in the 'coloured bars' test (pictured above).

The Greyscale test used a test image consisting of a circular disc which smoothly changes from white to black on a black and white background. Our viewing panel used this to spot banding artefacts and assess the smoothness of the greyscale representation.

The Movie/photo test was carried out with the monitors set up for sRGB (as described above). We looked at a selection of photos and video footage and decided which gave the most pleasingly realistic images.

Table of features

	ACER	BELINEA	BENQ	CTX	LG	
MANUFACTURER	ACER	BELINEA	BENQ	CTX	LG	
MODEL	AL1922HS	10 19 20	FP937S	S966A	FLATRON L1950	
Price inc VAT (ex VAT)	£279 (£237.45)	£287.88 (£245)	£210.33 (£179)	£219 (£186.38)	£279 (£237.45)	
URL	www.acer.co.uk	www.belinea.co.uk	www.benq.co.uk	www.ctxeurope.com	http://uk.lge.com	
Tilt/swivel/height/rotate adjustment	✔/✔/✔/✔	✔/✗/✔/✔	✔/✗/✗/✗	✔/✗/✗/✗	✔/✔/✔/✗	
Resolution	1,280 x 1,024	1,280 x 1,024	1, 280 x 1,024	1,280 x 1,024	1,280 x 1,024	
Number of colours (millions)	16.7	16.7	16.2	16.7	16.2	
Response time (ms)	20	25	12	12	12	
Contrast ratio	600:1	600:1	500:1	450:1	500:1	
Maximum brightness (cd/m^2)	250	250	250	250	250	
Vesa mount	✔	✔	✔	✔	✔	
sRGB colour mode	✗	✗	✔	✗	✗	
Speakers	✔	✔	✗	✔	✗	
Headphone socket	✗	✔	N/A	✗	N/A	
VGA connector	✔	✔	✔	✔	✔	
DVI connector	✔	✔	✔	✗	✔	
USB hub	✗	✗	✗	✗	✗	
Number of ports	N/A	N/A	N/A	N/A	N/A	
Image-enhancement processor	✗	✗	✗	✗	✗	
External power adapter	✗	✗	✗	✗	✗	
Pixel guarantee	Class II	Class II	Class II	Class II	Class II	
Warranty	3yrs	3yrs	3yrs	3yrs	3yrs	
Power consumption (max)	60w	45w	40w	47w	43w	
Power consumption (standby)	3w	<1w	<1w	Not specified	1w	
Cable management	✗	✔	✔	✗	✔	
Kensington Lock	✔	✔	✔	✔	✔	
Weight (kg)	7	8.1	7.4	5.7	7	
Horizontal/vertical viewing angle (degrees)	178/178	178/178	140/140	140/130	160/160	
TCO standard	TCO 03	TCO 03	TCO 03	TCO 99	TCO 03	
SCORES						
Features	★★★☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★★☆☆	
Performance	★★★★★	★★★★★	★★★☆☆	★★★★☆	★★★★☆	
Value for money	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★☆	
Overall	★★★★★	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆	

For the best monitor prices go to www.pcw.co.uk/bestprices

	NEC	NEOVO	PHILIPS	SAMSUNG	SHARP	SONY	VIEWSONIC
	MULTISYNC LCD1970NX	**M-19**	**BRILLIANCE 190P6**	**SYNCMASTER 913N**	**LL-193A-B**	**SDM-HS95**	**VX912**
	£327.83 (£279)	£299.99 (£255.31)	£365 (£310.64)	£229.13 (£195)	£319.48 (£271.90)	£279 (£237.45)	£265.26 (£225.75)
	www.nec-display-solutions.co.uk	www.neovouk.com	www.philips.co.uk	www.samsung.co.uk	www.sharp.co.uk	www.sony.co.uk	www.viewsonic.co.uk
	✔/✔/✔/✗	✔/✗/✗/✗	✔/✔/✔/✔	✔/✗/✗/✗	✔/✗/✗/✗	✔/✗/✗/✗	✔/✗/✗/✗
	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
	16.7	16.2	16.2	16.2	16.2	16.2	16.2
	25	12	8	8	8	16	8
	600:1	500:1	600:1	700:1	500:1	500:1	500:1
	250	250	250	300	250	250	270
	✔	✔	✔	✔	✔	✔	✔
	✔	✗	✔	✗	✔	✔	✔
	✔	✔	✔	✗	✔	✗	✗
	✗	✔	✔	N/A	✔	N/A	N/A
	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✗	✗	✗	✔
	✗	✔	✔	✗	✗	✗	✗
	N/A	2	4	N/A	N/A	N/A	N/A
	✗	✗	✔	✗	✗	✗	✗
	✗	✔	✗	✗	✗	✗	✗
	Class II	Class II	Class I	Class II	Class II	Class II	Class II (but with zero fully dead pixels)
	3yrs	3yrs	3yrs	3yrs	3yrs	3yrs	3yrs
	45w	60w	52.5w	38w	35w	50w	40w
	2w	8w	<1w	1w	1.2w	1w	<1w
	✔	✗	✔	✔	✗	✔	✔
	✔	✔	✔	✔	✔	✔	✔
	7.5	5.9	8.1	7.2	6.2	6.8	6.7
	176/176	150/130	160/160	160/160	160/160	160/160	140/130
	TCO 03	TCO 99	TCO 03	TCO 03	TCO 03	Not specified	TCO 99
	★★★★☆	★★☆☆☆	★★★★★	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
	★★★☆☆	★★★☆☆	★★★☆☆	★★★★★	★★☆☆☆	★★★★☆	★★★★☆
	★★★★☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆

Pixel response time

The time taken for your graphics card to send a signal to turn a pixel on and the bright dot being displayed on the screen (rise time) is called the response time. There's a similar delay when the pixel is turned off – the panel must respond by extinguishing the dot, and this too takes a matter of milliseconds (fall time).

All this happens very quickly. If you're reading a web page or working on a spreadsheet, you won't notice the time. If you're a hardcore gamer with the latest graphics hardware running at outrageous frame rates, however, the delay can seem very slow.

A quoted response time of 25ms is usually the sum of the rise and fall times. However, there are many different ways in which pixel response time is quoted, which can result in misleading comparisons. Unless it's specifically quoted as an ISO standard response time (see graph), there's no way of telling which points on the response curve were chosen as the rise and fall figures. The ISO standard measurement is a black to white transition – usually the fastest transition. But more recently grey to grey transitions have been quoted, which are closer to real-world performance.

Pixel response time is inextricably linked with frame rates. The usual video frame rate of 25fps (frames per second) gives you 40ms per frame. If your response time is much over 40ms, you're likely to see ghosting and blurry motion in fast-moving video. This has always been one of the main complaints about TFT technology.

Ever decreasing pixel response times are being touted as a must-have feature, but below around 25ms the majority of users won't care. A 25ms response time gives you a maximum frame rate of 40fps which is faster than video and film, both of which appear smooth to the naked eye. It's only at very high frame rates that sub-25ms response time can become an issue.

If you're running a game at 60fps, you'll need a response time of just over 16ms to capture all the action, while a true 8ms response time is good for up to 125fps. These differences are very difficult to
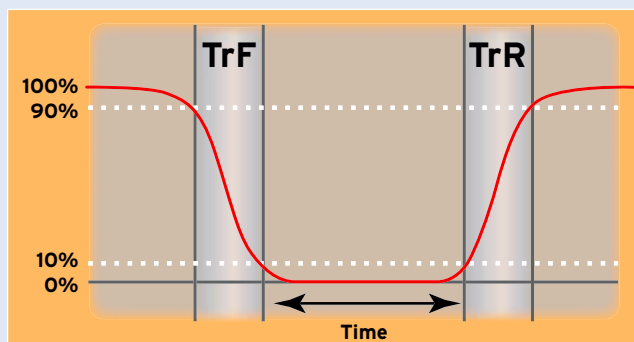
The ISO standard measurement of pixel response time measures the time taken for a pixel to fall from 90 per cent off full brightness to 10 per cent (fall) plus the time taken to rise from 10 per cent of brightness back to 90 per cent (rise).

spot in practice, especially when many games 'max out' at 60fps. We tested a range of monitors with response times from 25ms down to 8ms and found it very difficult to tell the difference.

Only in fast-paced games where ultra-sharp lines and high-contrast objects move at very high speed, is blurring or 'ghosting' likely to be observed. A fast response time allows moving objects to appear just as crisp as stationary ones.

Super-fast response times can come at the expense of performance in other areas, such as viewing angle and colour reproduction. In this group test, only the monitors with the slowest response times were capable of the widest viewing angles.

We'd recommend you err on the side of caution. Choose a panel with a response time of less than 25ms if you plan on viewing any fast-moving images, and insist on 16ms and below only if you're a gamer and you know you can see the benefit.

Editor's Choice

With so many different kinds of monitor it can be difficult to pin down one that suits everybody. Different uses require varying features which are rare to find combined well in one product.

Manufacturers are competing to bring out panels with ever faster response times and gamers are eager to lap them up. However, even the slowest panels here, at 25ms, are fast enough for most users and often offer the advantage of wide viewing angles.

If you require zero defective pixels, only the Philips Brilliance 190P6 has a no-faults-guaranteed Class I panel, the rest were Class II (see 'What to look for when buying', p102), although Viewsonic guarantees that if it suffers any faults, it will be in sub-pixels only.

Price is obviously a consideration, and the majority of the TFTs here are cheaper than the 17in versions we saw 10 months ago, so there are some great bargains out there.

The winners

Our first **Highly Commended** award goes to the **CTX S966A**. Its very low price, combined with good looks, a 12ms response time and

Acer AL1922HS

high image quality made it immediately stand out from the crowd. The Benq FP937 was hot on its heels, but we felt the CTX just beat it on image quality and design.

Our second **Highly Commended** award winner is **Samsung's Syncmaster 913N**. There are those of you who will demand an 8ms panel and this one is by far the cheapest on test. It combines this speed with a wide 160º viewing angle, 700:1 contrast ratio and group-beating 300cd/m^2 brightness. Its lack of DVI input and stand adjustments were a disappointment and precluded it from winning the top award.

Our **Editor's Choice** goes to the **Acer AL1922HS**. This sits in the middle of the price range, but delivers the best image quality along with the widest viewing angles and a stand that's fully adjustable including portrait rotation. Its height adjustment facility is a must for ergonomic work use – there's no point buying a attractive monitor only to have to prop it up with a pile of *PCW*s – and its smart, understated design makes it appropriate for use in a variety of environments. ■

CONTENTS

Seven at £799

WORDS: CHRIS CAIN **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

You can get a PC with great technology for £800 and some vendors even stretch to peripherals and software as well. We challenged seven companies to see what they could provide

Two years ago, buying a PC for much less than £1,000 involved making quite a few compromises. Going for a powerful processor could mean accepting the minimum amount of Ram, a cut-down hard disk, basic graphics or a complete lack of useful applications. Taking the price even lower would put you firmly in budget territory, with even less chance of finding a well-balanced system.

While we'd still recommend going for the best-specified computer you can afford, it's amazing how much things have changed and what you can get for your money today. Manufacturers are offering systems for less than £800 with technology classed as state-of-the-art just six months ago. What's

more, these changes aren't limited to the PC itself. Bundled peripherals, such as monitors, speakers, digital cameras and printers have also improved dramatically. Finding the best buys, however, is still as tricky as ever.

This month we asked leading PC manufacturers to send us the best systems they could provide for just £799 including VAT and delivery. No restrictions were applied to the components, bundled peripherals or software; we were keen to see just what each company could offer and how many corners would be cut. The results were certainly interesting and clearly show there's never been a better time to buy a new PC. Read on to find out just which system offers the best value for money and which one runs away with our Editor's Choice award.

Carrera Ultimate 64 PCW-09

Even at first glance, Carrera's Ultimate 64 has a lot going for it. Its Matrix midi-tower case is arguably the most stylish here and the design instantly won the approval of our labs staff.

A single LG dual-layer DVD rewriter sits at the top, while a floppy drive with an integrated 6-in-1 memory card reader occupies one of the 3.5in bays – handy for digital camera users. Having only one optical drive can make copying discs a pain, but, on the whole, it wouldn't bother us. The front also features two easily accessible USB2 sockets, audio connectors and a Firewire port. The look is finished off with a bright blue LED.

Inside, the Ultimate 64 is built around an Asus K8V SE Deluxe motherboard with an Athlon 64 3700+ processor clocked at 2.4GHz – the joint fastest on test. This is backed up by 512MB of Ram and a 200GB Maxtor hard disk. Having the fastest processor doesn't always make for the fastest PC and the Ultimate came in a tight second and just ahead of the Mesh Matrix Eclipse PCW in our Sysmark 2004 SE tests.

Although the Asus board has an 8x AGP slot, the system's 256MB ATI X800 All-in-Wonder graphics card blew away the competition in 3Dmark05. It also notched up a healthy score in Far Cry. Add an integrated TV tuner and video-capture facilities and you've got yourself a real winner.

The Carrera has plenty of room for add-ons with four more USB2 ports and Firewire at the rear and has exactly the same 17in Benq TFT screen, speakers and Microsoft keyboard and mouse as the Watford Aries. You also get Microsoft Works 8, Easy CD Creator and Panda Anti-virus on the software front, plus ATI's utilities for the All-in-Wonder card.

Despite being the only PC here not to feature PCI Express, the Carrera Ultimate 64 PCW-09 is a cracking performer that's packed with features. It even looks good.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION Carrera 0871 855 8855 **www.carrera.co.uk**
PROS Great performance; graphics card
CONS No PCI Express; no modem
VERDICT
A well thought-out system with plenty of performance, features and expansion facilities

FEATURES	★★★★☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

Evesham Axis SB

Evesham's entry is remarkably similar to its Nforce GT system reviewed in our July 2005 issue. Not only does it have the same black and silver ATX case, but many of the internal specifications are also similar.

The Axis SB is designed around an AMD Athlon 64 3200+ processor, fitted to an MSI K8N Neo-4 Platinum Nforce4 Ultra motherboard. Two Dimms provide 512MB of dual-channel memory and there are two spare slots for further expansion. The case itself is easy to open, with a clip-based side panel and it's tidy inside.

There's a 160GB hard disk, which is small compared to the 200GB offerings on other PCs here. However, unless you intend to edit video, build a sizable photo library or develop a large mp3 music collection, this shouldn't be too much of an issue. The case offers plenty of room for additional drives.

One area of concern is the 128MB Geforce 6600 graphics card. This performs far better than integrated chips but doesn't stack up well against the GT version or ATI offerings used in the competition. It explains the PC's 3Dmark05 scores, which shows that anyone looking to run modern games at the monitor's native resolution may be disappointed with the results. The Axis also came in the bottom half of our Sysmark 2004 SE results table.

Other components include a Sony DVD rewriter and matching DVD-Rom drive, six USB2 and two Firewire sockets, plus twin Gigabit Ethernet ports. A set of Creative Inspire 5800 5.1 speakers, a good-quality Microsoft keyboard and mouse and a 17in Viewsonic VX715 monitor round off the hardware.

Evesham bundles Microsoft Works 8 and Roxio Easy Media Creator Basic with the Axis, along with Sonic Cineplayer for watching DVDs and Etrust anti-virus. All in all, this is a good starter pack. While Evesham has cut some corners to hit the £799 price point, the Axis SB is a very expandable PC.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION Evesham 0870 160 9500 **www.evesham.com**
PROS Plenty of room for expansion
CONS Relatively small hard disk; graphics
VERDICT
The Evesham isn't the fastest system here, but it's still a capable machine

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Intellect Prodesk A64/3000+

This system is possibly the most interesting PC in our group test. It features several recent technologies and is the only machine that came with the new Windows XP x64 Edition pre-installed.

The Prodesk A64/3000 + is one of two to have an Althon64 3000+ processor, clocked at 1.8GHz, supported here by a whopping 2GB of Ram. This is supplied as two 1GB Dimms and the Gigabyte motherboard has two more slots for extra memory. All of this is complemented by a 200GB Maxtor hard drive, more than enough storage for most users' immediate needs.

A 13-in-1 memory card reader is included, along with an NEC dual-layer DVD rewriter and, although plain, its case is more appealing than many of its rivals. The single optical drive does make disc-to-disc copying a little laborious, but this isn't likely to be a problem. The Pro Desk comes with a Microsoft multimedia keyboard and optical mouse, and its Sharp LL-176GB 17in monitor delivers a crisp image.

Digging further down reveals one reason for so much Ram. Intellect has used a 256MB Nvidia Geforce 6200 Turbocache graphics card, which has 64MB of its own memory and borrows the rest from the system. The technology is designed to bring more power to lower-priced machines but can't hold its own against the competition here, as demonstrated by the lowest Far Cry and 3Dmark05 scores.

The extra Ram did help lift the Intellect's Sysmark 2004 SE results and the PC can cope well with standard office applications. There's also good news on the expansion front with eight USB ports and two external 800Mbits/sec 1394b Firewire ports. That said, the inclusion of 64bit Windows could prove a problem with drivers for some hardware. Software-wise the machine comes with the splendid Open Office 1.1, Avast Anti-virus and Nero Reloaded.

In all, the Intellect is a well-specified system let down by the few corners cut to meet the price.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION Intellect 08701 225 590 **www.intellect.uk.com**
PROS 64bit Windows; memory; 1394b Firewire
CONS Underpowered graphics; processor speed
VERDICT
Despite some excellent features, the Intellect failed to impress

FEATURES	★★★★☆
PERFORMANCE	★★☆☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Jal Serena+

The Serena+ is well named but its black and silver tower case doesn't stand out from the crowd. The front includes two optical drives, a Benq DVD-Rom unit and a 16-speed dual-layer DVD rewriter from Toshiba/Samsung, a 3.5in floppy drive, plus USB2 and audio connectors neatly concealed behind a small grille.

Unlike some modern cases the Jal's requires a bit of screwdriver action before you can remove the side panel. Inside, the PC is designed around an Athlon 64 3200+, running at 2GHz, ably supported by two 512MB Dimms giving a total of 1GB of memory. Two slots remain for further modules and the ATI-based Optronix motherboard can take up to 4GB. The system managed a Sysmark 2004 SE score of 169, putting it firmly in the middle of the pack.

As with the Evesham the hard disk is a 160GB model – adequate but dwarfed by the 200GB drives on most other machines here. The Serena includes the popular Geforce 6600GT graphics card, which helped it to an average of 58fps in Far Cry and 3,107 under 3Dmark05.

In terms of external expansion there's plenty of room to grow with another four USB2 ports at the rear, plus Firewire, serial, parallel and PS/2 connectors. There's also an output for an onboard graphics chip, bypassed with the superior card, an Intel modem, Ethernet and five PCI slots.

The Serena+ comes bundled with a wireless Logitech keyboard and rechargeable mouse, plus a Viewsonic VG712s monitor.

Jal is the only manufacturer to supply the often under-rated Microsoft Works Suite 2005, which includes six popular packages including Word, Money and Encarta. It's not Office but it's perfect for family computing. There's also a 30-day trial of PC-Cillin anti-virus software – something of a must for Windows users these days.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Jal 08707 525 810
www.jal.co.uk
PROS Plenty of room for expansion
CONS Small hard disk
VERDICT
Jal's Serena+ is a good package for the price, but it isn't outstanding in any way

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Mesh Matrix Eclipse PCW

Built around an imposing and bulky Chieftec tower case, the Matrix Eclipse looks best when tucked away out of sight. The good news is that the specification is far more appealing.

At the heart of the Matrix is an Athlon 64 3500+ processor, running at 2.2GHz, backed by 512MB of PC3200 Ram. Two additional memory slots are available should you need more, and a 200GB Maxtor hard disk offers plenty of space. As demonstrated by its Sysmark 2004 SE score of 185, the system should comfortably handle just about any task thrown at it.

This is the only PC here built around the A8N-SLI Deluxe motherboard from Asus. This Nforce4 board enables two PCI Express graphics cards to work in parallel, which is a bonus for gamers looking to play the latest titles in high resolutions. Only one 128MB Geforce 6600GT card is supplied in this configuration. It can't quite match the power of the ATI Radeon X800 chip found in the Carrera and Watford Aries, but still gave a strong performance in our Far Cry tests.

The Eclipse has plenty of internal and external expansion options, including seven USB2 ports and a single Firewire socket. It was also interesting to see a standard floppy along with the usual optical drives – a model with a built-in memory card reader would have been preferable.

As with the Evesham and Jal systems, the Mesh comes with a Viewsonic monitor. This 17in panel provides a clear image but lacks a DVI connector to make the most of the system's graphics. How much difference this makes to most users is another matter.

On the software front, you get Microsoft Windows XP Home and Works 8, plus video, disc burning and backup utilities from Cyberlink.

While the installed graphics card could be better, the SLI option and strong performance overall make the Mesh Eclipse PCW a tempting choice.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Mesh 0870 0464 747
www.meshcomputers.com
PROS Fast; SLI graphics option
CONS Monitor lacks DVI; there are better graphics cards
VERDICT
The Eclipse is a good all-round system with plenty of power

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

Nethighstreet Net PCW 799

Thanks mainly to its Socket 754 Athlon 64 3400+ processor, the Net PCW 799 was the fastest PC in our Sysmark 2004 SE tests with a score of 190.

The Mesh Matrix includes the seemingly quicker 3500+ CPU, but this runs at 2GHz while the chip used here is clocked at 2.4GHz.

The processor sits at the centre of an MSI motherboard with 512MB of Ram. Unfortunately this board provides just two Dimm slots, limiting users to a maximum of 2GB or 1.5GB in this configuration.

Much better news is the inclusion of a 200GB Maxtor hard disk, an Asus DVD-Rom unit and an NEC 3520A dual-layer DVD rewriter. There's also a floppy drive with an integrated 6-in-1 memory card reader.

The MSI board offers both an AGR (advanced graphics riser) and an x16 PCI Express slot for graphics cards. While the former is compatible only with certain adapters, this is a moot point as the system comes with a 128MB PCI-Express Geforce 6600GT fitted in the latter – a popular choice.

This is the only machine to pair this card with a 19in monitor – in this case, a 12ms Philips 190S5 LCD. The Net PCW 799 managed a 3Dmark05 score of 3,800 and produced nearly 65fps in our Far Cry tests, providing smooth gameplay at a resolution of 1,024 x 768.

There's plenty of room for both internal and external expansion, including four free 3.5in bays, four rear and two front USB2 ports and Gigabit Ethernet.

We were, however disappointed to see that the backplate on our review model had holes pushed out where it didn't have connectors.

The system comes preloaded with Windows XP Home, PowerDVD 5, a suite of Nero utilities for burning your CDs and DVDs and Open Office. It also ships with Norton Internet Security 2005 and games.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Nethighstreet 08700 271 339
www.nethighstreet.com
PROS Performance; 6-in-1 card reader; 19in screen
CONS Only two Dimm slots
VERDICT
The Net PCW 799 is a great-value all-round performer

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

Watford Aries Performa 7211

Last in this test but by no means least, Watford's Aries was one of the most interesting systems on test. As with the Carrera, it uses an impressive 256MB ATI Radeon graphics card and this time around it's a PCI Express X800XL.

Unfortunately, the PC's relatively slow Athlon 64 3000+ managed to hold its performance back to deliver the lowest Sysmark 2004 SE score of the pack – despite being paired with 1GB of Ram. This said, the machine is still ideal for general productivity tasks – it just doesn't cut the mustard when compared to the others here. It also scored the second highest 3Dmark with 4,787.

We found the Aries case design a little annoying. It looks as if two optical drives are installed when there's really only a single LG DVD rewriter, and this was impossible to open using the eject button on our review model. In addition, the floppy drive bay does nothing but smile at the user – the real floppy is directly above and includes a more useful integrated 6-in-1 memory card reader. Things are much better inside with tool-free drive bays and expansion slots, a healthy 200GB hard drive and four Dimm slots.

In terms of peripherals Watford supplies the same 17in Benq monitor, Microsoft keyboard and mouse set and Creative 5.1 speakers found on the Carrera. Six USB2 (four rear and two front) ports and Firewire connections allow for extras, although the lack of a modem is a little disappointing. However, the ATI RX480-based motherboard does include Gigabit Lan and support for 7.1-channel surround sound.

To get users up and running the system comes with Microsoft Works 8 and Easy CD Creator, along with Windows XP Home Edition. Watford has also included Panda Anti-virus to help keep any nasties at bay.

All in all the Aries Performa is a capable machine for the money, let down by the performance of the processor and a couple of small design quirks.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE & PRODUCT INFORMATION Watford 0871 666 6060 www.ariespc.com
PROS Good graphics; 6-in-1 card reader
CONS Performance
VERDICT
A well-rounded system with great graphics, but it's let down by its slow processor

FEATURES	★★★★☆
PERFORMANCE	★★☆☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Desktop PC alternatives

There are alternatives to buying a traditional PC. The price of notebooks has fallen in recent years and these can offer greater flexibility for those who don't need the power or expansion potential of a desktop machine. In fact, many of the latest technologies, such as PCI Express and dual-layer DVD writers, have already found their way into portable PCs.

Dell is currently offering the Inspiron 510m for £728 including VAT and delivery. Weighing just over 2.5kg, this Centrino system comes with a 1.6GHz Intel Pentium M processor, a 15in XGA screen, 512MB of DDR Ram, a 40GB hard disk, an eight-speed DVD writer, wireless networking and Windows XP Home Edition.

The Inspiron features Intel Extreme graphics that share up to 64MB of main memory, which means this one is more suited to standard office applications than 3D games. A pair of USB2 ports and a four-pin Firewire socket allow a variety of peripherals to be connected easily.

Dell's systems are covered by a basic three-year warranty (two years on site), which includes 30 days of online training. The company is also bundling a free colour inkjet printer at the time of writing, although this comes with 'trial' ink cartridges.

Meanwhile, Evesham is selling the Voyager A210 for exactly £799. Based around an AMD Turian 64 34+ mobile processor, it too has 512MB of DDR memory, a 15in screen and Windows XP Home Edition. There's also a healthy 60GB hard disk, a dual-layer DVD writer, Ethernet, 802.11g wireless networking, four USB ports and a Type II PC Card slot. In addition, the Voyager includes an ATI X700 PCI Express graphics chip with 128MB of memory, making it an ideal all-rounder.

To get its users started straight away, Evesham bundles the excellent Microsoft Works 8 and Roxio Easy Media Creator 7.

Another alternative is to switch from the idea of Windows-based PC and opt for an Apple Macintosh instead.

If you're after a notebook, Apple's Ibook range starts at £699. As standard this base model comes with a 1.2GHz PowerPC G4 processor, 256MB of Ram, a 30GB hard disk, a DVD/CD-RW combo drive and a 12.1in TFT display. Taking the price to £789 will get you a more useful 512MB of memory and a 60GB hard drive.

All Ibooks include an ATI 9200 graphics chip with 32MB of dedicated video memory, Airport Extreme 802.11g wireless networking, Ethernet, two USB ports and Firewire. Machines come with Mac OSX Tiger, Appleworks 6, a 30-day trial of Microsoft Office and the outstanding Ilife suite, comprising Iphoto, Itunes, Garageband, Imovie and IDVD.

Alternatively, on the desktop front, you could opt for the all-in-one Emac, which looks a bit like a white version of the original Imac. A system with a 1.42GHz G4 processor, 512MB of Ram, integrated 17in flat-screen CRT display, 160GB hard disk, dual-layer DVD writer, 64MB ATI 9600 graphics, Bluetooth, Airport Extreme wireless networking, keyboard and mouse can be yours for £748.99 including delivery.

Again, Apple bundles Tiger, Appleworks 6 and Ilife with the Emac, while two Firewire ports and three USB sockets allow for peripherals.

Whichever way you go, there are a lot of options for those with £799 in their pocket. There really has never been a better time to buy.

Table of features
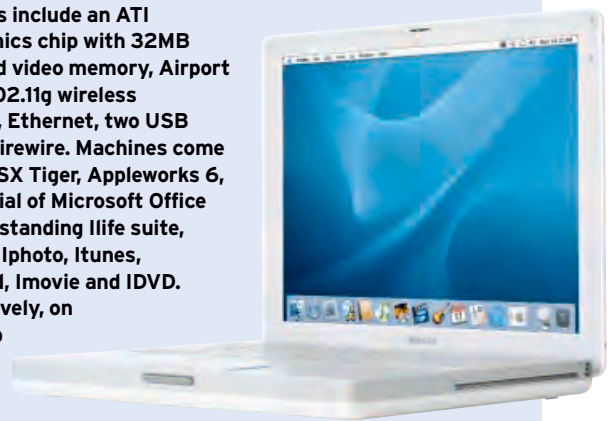
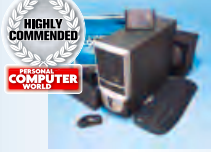|	CARRERA	EVESHAM	INTELLECT	
MANUFACTURER	CARRERA	EVESHAM	INTELLECT	
MODEL NAME	ULTIMATE 64 PCW-09	AXIS SB	PRODESK A64/3000+	
Price inc VAT (ex VAT)	£799 (£680)	£799 (£680)	£799 (£680)	
Sales telephone	0871 855 8855	0870 160 9500	08701 225 590	
URL	www.carrera.co.uk	www.evesham.com	www.intellect.uk.com	
HARDWARE				
Processor	Athlon 64 3700+	Athlon 64 3200+	Athlon 64 3000+	
Motherboard	Asus K8V SE Deluxe	MSI K8N Neo4 Platinum	Gigabyte GA-K8NF-9	
Chipset	Via K8T800	Nforce4 Ultra	Nforce4 4x	
Available memory/type	512MB PC3200 (400MHz)	512MB PC3200 (400MHz)	2GB PC3200 (400MHz)	
Occupied/spare memory (Ram) slots	1/2	2/2	2/2	
Max memory in this configuration	2.5GB	2.5GB	4GB	
Max memory supported by motherboard	3GB	4GB	4GB	
Hard disk manufacturer and model	Maxtor 6L200M0	Western Digital Cavier SE WD1600JD	Maxtor 6B200M0	
Secondary hard drive	None	None	None	
Total storage space	200GB	160GB	200GB	
EXPANSION AND I/O				
No of 3.5/5.25in bays	7/4	5/4	6/4	
No of free 3.5/5.25in bays	5/3	4/3	5/3	
No of PCI/PCI-x16/PCI-x4/PCI-x1 ports	5/0/0/0	4/1/1/1	3/1/0/2	
No of free PCI/PCI-x16/PCI-x4/PCI-x1 ports	5/0/0/0	3/0/1/1	3/0/2	
No of USB2/Firewire ports	6/2	6/2	8/2	
No of serial/parallel/PS/2 ports	1/1/2	1/1/2	1/1/2	
MULTIMEDIA				
Primary optical drive	LG GSA-4163B	Sony DVD RW DW-Q28A	NEC DVD-RW ND-3540A	
Optical drive formats and DVD write speed (max)	DVD +/-R: 16x, DVD+RW: 8x, DVD-RW: 6x, DVD+R DL: 4x, DVD-Ram: 5x	DVD+R: 16x, DVD-R: 8x, DVD+R DL: 2.4x, DVD-/+RW: 4x	DVD +/-R: 16x, DVD-R DL: 4x, DVD+R DL: 8x, DVD+RW: 8x, DVD-RW: 6x	
Secondary optical drive	None	Sony DVD-Rom DDU1615	None	
Optical drive formats and speed (max)	N/A	DVD-Rom: 16x	N/A	
Soundcard	Realtek AC97	Realtek AC97	Realtek AC97	
Speakers	Creative SBS560	Creative Inspire 5.1 P5800	None separate (in monitor)	
Graphics type/memory	ATI All-in-Wonder X800/256MB (AGP)	Nvidia Geforce 6600/128MB	Nvidia Geforce 6200 Turbocache/256MB	
Screen type, size and (maximum resolution)	Benq FP737, 17in, 1,280 x 1,024	Viewsonic VX715, 17in, 1,280 x 1,024	Sharp LL-173GB, 17in, 1,280 x 1,024	
OTHER INFORMATION				
Modem/other hardware	None/Floppy with 6-in-1 reader	V.92 modem	None/13-in-1 card reader	
Network	Gigabit Lan	Dual Gigabit Ethernet	Gigabit Ethernet	
Operating system	Windows XP Home	Windows XP Home	Windows XP Pro x64 Edition	
Bundled software	Microsoft Works 8, Easy CD Creator 7, Panda Anti-virus, Restore CD	Etrust Anti-virus, Microsoft Works 8, Roxio Easy Media Creator Basic DVD 7, Sonic Cineplayer 2.01, Adobe Acrobat Reader 6	Open Office 1.1, Avast Anti-virus, Nero Reloaded	
Standard warranty (RTB: return to base; C&R: collect and return)	1yr on-site parts and labour, 5yrs RTB labour only	2yrs on-site, 1yr RTB	1yr on-site	
SCORES				
Features	★★★★☆	★★★☆☆	★★★★☆	
Performance	★★★★★	★★★☆☆	★★☆☆☆	
Value for money	★★★★☆	★★★★☆	★★★★☆	
Overall	★★★★☆	★★★☆☆	★★★☆☆	

For the best PC prices go to www.pcw.co.uk/bestprices

	JAL	MESH	NETHIGHSTREET	WATFORD
	SERENA+	**MATRIX ECLIPSE PCW**	**NET PCW 799**	**ARIES PERFORMA 7211**
	£799 (£680)	£799 (£680)	£799 (£680)	£799 (£680)
	08707 525 810	0870 0464 747	08700 271 339	0871 666 6060
	www.jal.co.uk	www.meshcomputers.com	www.nethighstreet.com	www.ariespc.com
	Athlon 64 3200+	AMD Athlon 64 3500+	Athlon 64 3400+	Athlon 64 3000+
	Optronix OP-K9A200-MLF	A8N-SLI Deluxe	MSI K8N Neo 03-F	Tul RX480
	ATI RS480	Nforce4 SLI	Nforce4 4x	ATI RX480
	1GB PC3200 (400MHz)	512MB PC3200 (400MHz)	512MB PC3200 (400MHz)	1GB PC3200 (400MHz)
	2/2	2/2	1/1	2/2
	3GB	2.5GB	1.5GB	3GB
	4GB	4GB	2GB	4GB
	Maxtor 6L160MO	Maxtor 6B200MB	Maxtor 6B200MO	Maxtor 6L200MO
	None	None	None	None
	160GB	200GB	200GB	200GB
	7/4	4/3	6/4	5/4
	5/2	2/1	4/2	3/3
	5/1/0/1	3/2/0/2	3/1/0/1	2/1/0/3
	4/0/0/1	2/1/0/2	3/0/0/1	2/0/0/3
	6/1	7/1	6/0	6/2
	1/1/2	0/1/2	1/1/2	1/1/2
	TSSTCorp TS-H552U	Sony DVD RW DW-Q28A	NEC DVD-RW HD-3520A	LG GSA-4163B
	DVD +/-R: 16x, DVD +/-RW: 4x, DVD+R DL: 4x	DVD+R: 16x, DVD-R: 8x, DVD+R DL: 2.4x, DVD-/+RW: 4x	DVD +/-R: 16x, DVD-R DL: 4x, DVD+R DL: 4x, DVD+RW: 8x, DVD-RW: 6x	DVD +/-R: 16x, DVD+RW: 8x, DVD-RW: 6x, DVD+R DL: 4x, DVD-Ram: 5x
	Benq DVD-Rom	Sony DVD-Rom DDU1615	Asus E616P3 DVD-Rom	None
	DVD-Rom: 16x	DVD-Rom: 16x	DVD-Rom: 16x	N/A
	Realtek AC97	Nvidia MCP04	Realtek AC97	Realtek AC97
	Altec Lanseng 3151	Creative Inspire 5.1 P5800	Creative 580	Creative SBS560
	Nvidia Geforce 6600GT/128MB	Nvidia Geforce 6600GT/128MB	Nvidia Geforce 6600GT/128MB	ATI X800XL/256MB
	Viewsonic VG712s, 17in, 1,280 x 1,024	Viewsonic VE710b, 17, 1,280 x 1,024	Philips 190S5, 19in, 1,280 x 1,024	Benq FP737, 17in, 1,280 x 1,024
	V.92 modem/floppy	V.92 modem/floppy	None/Floppy with 6-in-1 card reader	None/Floppy with 6-in-1 reader
	Ethernet	Dual Gigabit Ethernet	Gigabit Ethernet	Gigabit Lan
	Windows XP Home	Windows XP Home	Windows XP Home	Windows XP Home
	Microsoft Works Suite 2005, Nero Burning Rom, Power DVD, PC-Cillin (30-day trial, registration required)	Microsoft Works 8, Cyberlink PowerDVD/Power2Go/Power Producer3/Power Director3/Power Backup/MediashowSE/Power Cinema4	Power DVD 5, Nero OEM suite, Open Office, Norton Internet Security 2005, Recovery CD, Games	Microsoft Works 8, Easy CD Creator 7, Panda Anti-virus, Restore CD
	2yrs parts and labour onsite, monitor: 3yrs manufacturer swapout, lifetime technical support	2yrs on-site, 1yr RTB (mainland UK only)	1yr RTB parts and labour, 2yrs RTB labour	1yr on-site parts and labour, 5yrs RTB labour only
	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
	★★★☆☆	★★★★☆	★★★★☆	★★☆☆☆
	★★★★☆	★★★★★	★★★★★	★★★★☆
	★★★☆☆	★★★★★	★★★★☆	★★★☆☆

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.
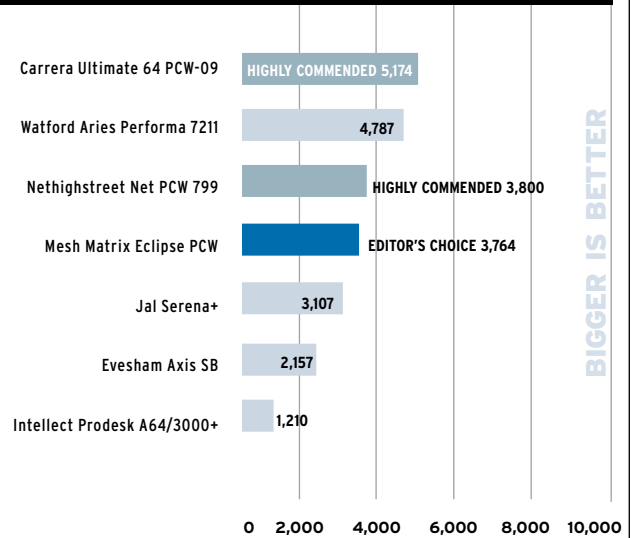
Lab results

vnu labs

Sysmark 2004 SE

System	Score
Nethighstreet Net PCW 799	HIGHLY COMMENDED 190
Carrera Ultimate 64 PCW-09	HIGHLY COMMENDED 187
Mesh Matrix Eclipse PCW	EDITOR'S CHOICE 185
Jal Serena+	169
Evesham Axis SB	161
Intellect Prodesk A64/3000+	144
Watford Aries Performa 7211	128

BIGGER IS BETTER

0 50 100 150 200 250
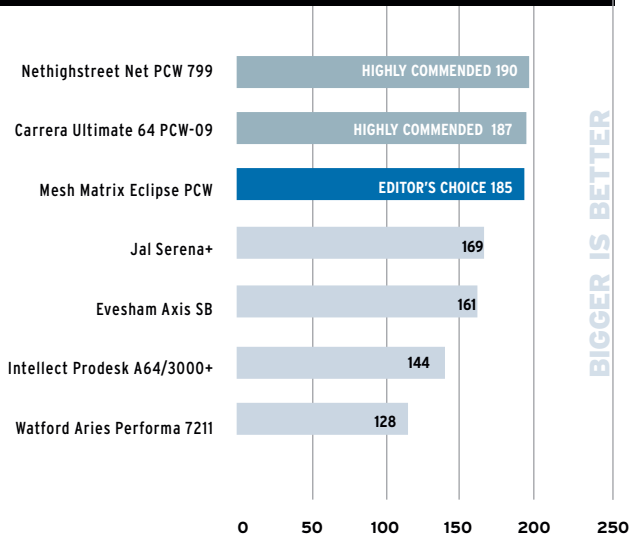
3Dmark05 (1,024 x 768 at 32bit)

System	Score
Carrera Ultimate 64 PCW-09	HIGHLY COMMENDED 5,174
Watford Aries Performa 7211	4,787
Nethighstreet Net PCW 799	HIGHLY COMMENDED 3,800
Mesh Matrix Eclipse PCW	EDITOR'S CHOICE 3,764
Jal Serena+	3,107
Evesham Axis SB	2,157
Intellect Prodesk A64/3000+	1,210

BIGGER IS BETTER

0 2,000 4,000 6,000 8,000 10,000

Please see page 12 for an explanation of how we tested the PCs

Editor's Choice

All the PCs on test this month surprised us with their levels of performance, features and sheer value for money. Any one of them would be perfect for general office or home use and it's great to see that systems with 256MB graphics cards, large hard disks, 19in screens and plenty of expansion facilities are available for just £799. The Intellect Prodesk A64/3000+ even came with Windows XP Professional x64 Edition and a whopping

'Any one of the PCs on test would be great for home or office use'

2GB of memory. We were also surprised to find ourselves secretly hoping for a beige box to break up the run of black and silver cases.

Some machines, however, were better specified than others. We looked at their performance under the very latest versions of Sysmark 2004 SE and 3Dmark, how well each system had been put together, hardware features, the quality of the bundled software and expansion options.

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Mesh Matrix Eclipse PCW

With its fast and flexible All-in-Wonder graphics card, integrated memory card reader, large hard disk and Athlon 64 processor, the Carrera Ultimate 64 PCW-09 demonstrates a great balance of power and features for the price. Carrera went into liquidation earlier this year, and not for the first time. It's now owned by Watford, which should ensure its longevity.

The Mesh Matrix Eclipse PCW may not be the easiest on the eye, but its SLI technology means gamers can enjoy the best-looking graphics. Dual optical drives, a 200GB hard disk, good performance, solid peripherals and a useful software bundle also make this a great choice. The **Mesh Matrix Eclipse PCW** wins our **Editor's Choice**, and **Carrera's Ultimate 64 PCW-09** gets a **Highly Commended** award.

Finally, despite its limited memory expansion, the **Nethighstreet Net PCW 799** deserves a **Highly Commended** award. Thanks, in part to its 2.4GHz processor, the PC blazed through the applications in our Sysmark tests, produced smooth graphics in game tests and was the only system with a 19in monitor. The inclusion of Open Office and Norton Internet Security and Nero media utilities also allows users to get started straight away.

WORDS: ANNA LAGERKVIST

Share and share alike

Uploading your photos to an online album means you can share your digital pictures for free. We check out 10 services that bring your memories to life

The old days of getting the photo album out when friends came around for dinner are long gone – in this digital age it is much easier to share your photos online with the help of the multitude of photo websites around. There's no need to email large image files that take ages to download or burn photos onto a CD and post it to friends and family. Photos can now be accessed online anywhere and anytime. Most of the sites are free and, after you've created your online albums, just email your friends to tell them how to access the photos. If you still want prints to put in an album or to frame at home, then most of the sites we've looked at here offer a print service, where the photos will be delivered to your doorstep within days of ordering.

Most photo-sharing websites work in the same way – you register before you can start uploading snaps. Registration is often free, and you enter your name, email address and sometimes postal address and phone number.

We wanted to carry out a blind test, where each company would have no idea that *PCW* was looking at the service, so we could ensure no special treatment was afforded us. We registered under a private name and used a home delivery address to test the services as they would be available to any customer. We added an identical set of 10 photos to each of the sites and then went on to order one 6 x 4in glossy copy of each. Where applicable, we opted for the first-class delivery option.

All the sites sent some kind of confirmation email upon registering and then again after an order had been placed.

Left: Bonusprint offers a no-frills approach, with quick delivery

Below: You can't buy prints, but for photo sharing the Canon Image Gateway is a good choice

Once you've set up your account, creating online photo albums is the fun bit. You can assign names and descriptions to your albums, such as your holiday destination, for example. Adding photos is done manually by browsing the photos on your computer and uploading the ones you want, usually 10 at a time. If you tend to upload lots of holiday snaps on your return, a quicker option is to download the dedicated software offered by some photo-sharing sites. Once installed on your computer, you can take your time selecting the photos you want to upload and once you hit the 'upload' button, the images will be transferred to an online album.

Many of the sites offer some kind of editing tools, including adding frames and borders, rotating images or adding text. Some go even further and have special effects and filters available so you can really play around with your snaps. Once you're happy with your albums, it's time to invite people to see your photos. Typically, there will be a section on the site where you can enter email addresses of the people you wish to invite. They will then be sent an email saying that your photos are ready to view.

One thing to keep in mind, though, is the time it will take to upload images, especially if you're on a dial-up connection as you will effectively be paying per image uploaded. High-resolution shots and large orders will take a while to process, even if you have a broadband connection, where upload speeds often tend to be a lot slower than download speeds, sometimes 50 per cent less.

We reviewed 11 online photo services to find out what they offer and how much they cost. The reviews below should help you make a choice depending on your needs.

Bonusprint
www.bonusprint.co.uk

Bonusprint has moved with the times since the days when people sent their 35mm films by post to be developed. It always was, and still is, cheaper than developing snaps in a high-street shop, and offered the cheapest prices for prints in this test – only 9p per print for orders of 100 prints or more. It charges a flat rate of £1.20 for delivery, which is reasonable, especially if your orders tend to be on the large side.

Before you can start uploading your photos, you need to install a utility called Pix from the Bonusprint site. Once installed, uploading is a simple process, although Pix's interface is slightly confusing. There is no online gallery available, so this is purely a site for ordering prints. If you don't want to upload your images online, you can send in your memory card or a CD and the prints will be delivered to your door.

The site doesn't offer any frills, such as an online gallery or image-editing tools, but the print quality was acceptable. Our snaps were printed out on Kodak paper with good colour reproduction. However, they were darker than we'd hoped for, which reduced detail. Our pictures arrived within 36 hours of placing the order, which makes it one of the quicker services tested here.

Canon Image Gateway
www.cig.canon-europe.com

Along with the other big players in the digital camera market, such as Fujifilm and HP, Canon offers its own photo-sharing service for users of Canon cameras. When you register on the site you will need to specify the camera model you use.

Photos are uploaded manually, up to 10 at a time, as there is no downloadable upload software. This makes the upload process slightly long-winded, but when you're done, there are plenty of editing options. For uploading movies shot with your Canon digital camera you have to download and install some software before you can begin.

The support section is good, with recommendations on how to optimise the performance of your Canon camera.

TABLE 1: Costs of printing on the high street

SERVICE	QUANTITY (PRINTS)	PRICE PER PRINT
Snappy Snaps	1-5	79p
	6-50	20p
	51-99	18p
	100+	15p
Boots (24-hour)	1-19	30p
	20-49	20p
	50+	10p
Boots (one hour)	1-19	40p
	20-49	30p
	50+	20p
Boots in-store Kodak kiosk	1-19	49p
	20-49	39p
	50+	29p

Security issues explained

Being able to share your photos online with friends and family is obviously a great option, especially if you've got relatives living in far away places. There are some security issues to bear in mind though, especially if you are planning to put pictures of your kids online. Some of the websites we've looked at here are set up so only those you have invited can view your photos and, even then, they must register using the email address you specified in order to see your albums. This is the safest option and should provide enough peace of mind for you to put your private shots online. Other sites will send a link to the friends you invite, which they will have to type into their browser in order to see your photos. This is less secure, as the link can easily be passed on or even guessed. If you're ever in doubt over a site's security or worried about putting photos online, then the only completely secure option is not to do it.

TABLE 2: Costs of using compact photo printers

Investing in a compact photo printer (sometimes called a toaster printer) is a good idea if you print a lot of photos and are worried about losing some control over the output when using a printing service. Using this sort of printer means you get your paper prints immediately, there are no delivery costs involved, and prints should last a long time. However, depending on the supplies you use, printing at home can work out more expensive than using third-party options.

We tested the six compact printers below and all produced good print quality. To find out how much it costs to print each photo, we printed as many as we could using the manufacturer's consumables until they couldn't print any more. Some printers have individual print cartridges for each colour, whereas others use one cartridge for three colours. The cost per print is likely to be higher with the tri-colour cartridge as you have to replace the whole cartridge even if just one colour runs out.

Model	Cost per print (6 x 4, glossy, no borders) established in PCW tests	Manufacturer's claimed price per print
Canon Selphy CP400	41p	Not stated
Canon Selphy DS700	78p	Not stated
Epson Picturemate	25p	29p
Epson Stylus Photo R300	40p	None
HP Photosmart 375	26p	24p
Lexmark P915	62p	40p minimum

Choosing images for purchasing prints is time consuming, as you have to select them individually, by checking boxes beneath each photo. Once you've created your selection and are ready to place your order, you'll be taken to a page listing selected print centres. At the time of testing this service, only one print service, Photobox, was listed (see review on page 122). As a photo sharing site though, it's a good option if you own a Canon camera.

FDIprint
www.fdiprint.com

This site is very confusing. On the one hand, it's got backing from Fujifilm so looked promising from the start. It has one of the most advanced set of image-editing tools of the services we've compared in this test and we were looking forward to prompt delivery of high-quality printouts of our holiday photos. Before we could upload any photos we had to download some software from the site. This allows you to organise and upload photos to the online server and then prints can be ordered.

The download process is very confusing, however and the site isn't very user friendly. The image-editing tools are decent and offer the opportunity to play around with your snaps.

On the other hand, ordering prints after you're finished editing is a long-winded and complex process. We weren't even sure if we had actually placed the order, even after adding address and credit card details, as no confirmation appeared on screen. It wasn't until we received the email confirmation that we knew our order was on the way. Then we waited. And waited.

Six days after placing the order, the prints had still not been dispatched and they finally turned up a week after ordering, making FDIprint the slowest service we tested.

The images weren't great either, with bleak colour, noticeable jagged edges on straight lines and they were
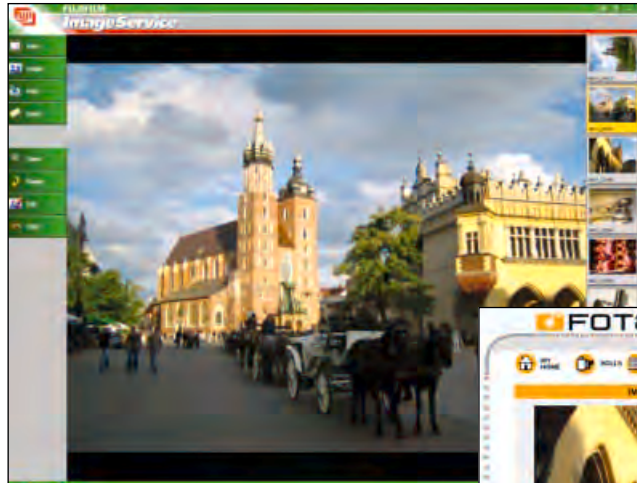
Above: FDIprint from Fujifilm was hard to use and delivery of prints took an age

Right: Fotango has many gift options, but is quite pricey

printed on low-quality paper. The site offers few alternative printing options (such as gift items and posters) and this, together with the slow delivery time and poor quality of prints, this service didn't impress us.

Fotango
www.photos.fotango.com

This is a great site for sharing your photos with friends and family – it's free to use and there is no limit on storage space, so you can safely upload all your holiday shots in one session.

One feature we didn't find anywhere else is the option to send film rolls for processing, for those who still use a film camera as well as digital devices. Part of the package is that the pictures on the rolls of film are scanned and put online so they can be shared along with your digital snaps. You can mix and match them in the albums as you wish.

While this is a great site for sharing your photos, it's one of the more expensive ones for printing them. Ordering only a few prints will set you back 49p per standard 6 x 4in photo and prices don't go below 24p per print if you order 40 or more. There are plenty of gift options, however, ranging from fridge magnets and t-shirts, to posters and frames. Users are also credited with three free prints every time a friend registers.

Our photos arrived within 36 hours of placing the order, making Fotango one of the quicker services here. The prints were excellent, with good detail and well-saturated, true colours. For digital prints that differ from the standard photo sizes, there are various cropping options available, so you can choose which area of a picture you want printed.

Jessops
www.jessopsphotoexpress.com

The Jessops photo-printing service differs slightly from the others we've looked at here, as it offers free

Left: Jessops Photo Express service produced good-quality prints and was one of the best services on test

in-store collection. Customers can choose whether they want to pay for first-class post and wait up to five days for delivery or select a preferred Jessops store and pick them up after two days.

Sharing your photos is simple, as the site is easy to navigate and uploading photos is quick, although it doesn't work as well on browsers such as Opera and Mozilla as it does on Internet Explorer. Bear in mind that storage space is limited to 70MB though, before you attempt to upload higher resolution shots.

When you're ordering prints, the photo size always defaults to 7 x 5in rather than the standard 6 x 4in. Should you want to change the print size, there is no 'select all' option, which is annoying, especially if you've just uploaded hundreds of photos and want to order the same print size for each.

We chose to pick up our ordered prints in store and this process works in the same way as picking up your developed 35mm film – remember to take the confirmation email with you and the prints should be available behind the counter. Prints are reasonably priced at 25p each for 6 x 4in copies and 15p each for orders exceeding 100 prints. Our pictures were available for collection two days after our order was placed, but there is no notification when prints are available in store – you either have to take your chances or phone to check. Quality was good – the prints came out very well, with a good level of detail and decent colour reproduction, if a little over-saturated – but it was one of the best on test.

Kodak Easyshare Gallery
www.kodakgallery.co.uk
This site, previously known as Ofoto, offers high-quality photos at affordable prices. The service is free and offers good value for photo sharing, as there is no limit on storage space. With impressive image-editing tools, this site is really worth a visit if you don't already have a photo-editing application on your computer. Besides the usual rotating and cropping tools, you can reduce red-eye, add tints and filters and correct imperfect exposure of your images.

The cost of 6 x 4in prints is 19p, which is reasonable, but there are no

Above: Easy to use, with a huge range of tools Kodak's Easyshare Gallery makes sharing simple

Below: Photobox will increase your storage space depending on how many orders you place

discounts for large volumes. New users receive 10 free prints when they first register with the site. Any free credits that you're entitled to are shown at the top of all ordering pages, which makes it easier to see what you can get without paying if you're planning on placing an order. The help section is one of the best we've seen and offers answers to even our most intricate queries.

The prints arrived within 48 hours of placing the order, which is not bad, although some of Kodak's competitors beat this delivery time. The prints didn't disappoint either. Printed on thick glossy paper with a decent level of detail, the colour reproduction was good although the photos were slightly dark.

Photobox
www.photobox.co.uk
Compared to some of the other sites reviewed in this test, Photobox might look pretty basic. Storage space is limited to 200MB, so if you're planning to add a lot of high-resolution snaps, you might be in trouble. For every order placed, though, your storage space is increased by 50MB, so if you order lots of prints, you'll be able to beef up your storage quickly.

Prints are not the cheapest we've seen, but acceptable, starting at 29p each and dropping depending on the size of your order. There are lots of gift options available – you can see your photo on mugs, calendars, mousemats and other novelty items.

The prints from Photobox were the first to arrive, within 24 hours of placing the order, but the quality could have been better. Compared to those ordered from other sites, the paper quality isn't great. Colour reproduction isn't that bad, if a little over-saturated, but the details still came out reasonably well compared to prints ordered from other sites.

Photobox also has an option to send photos to a UK-based mobile phone. The service is free for subscribers to the site, but the recipient will be charged at the normal MMS rate of their operator.

Pixum
www.pixum.co.uk
This is another site with storage space limited to 200MB. It's free to use and, once you've registered, the uploading process was one of the more straightforward we've seen. You can either browse and upload images manually or choose to download the Photo Upload tool, which allows you to organise and upload images when you're ready. This is a useful function, especially if you're on a dial-up connection. Images can also be uploaded via email or a Java applet available on the site.

There are limited editing options, but Pixum really excels when it comes to ordering prints. At 12p per 6 x 4in print, this is the best-value site we've come across. There are no discounts available and all orders are subject to a £1.90 delivery charge but, in total, an order from Pixum should work out as one of the cheapest. There is also an offer of 10 free prints as an incentive for new users.

However, the way the photo size options are listed on the order page is confusing. Only one measurement is listed – you can choose sizes such as

3.5in, 4in, 4.5in, and so on, but you're not given any information about whether this is the height or width of the photo. It would be much simpler if both the width and height measurements were quoted (eg 6 x 4in).

Our photos arrived promptly within two days of placing the order. They were pretty crisp and clear, although not as good as prints from some of the other services on test, especially when we looked closely, as it became obvious that the colours were slightly warm and suffered from jagged edges.

Snapfish/Truprint
www.snapfish.co.uk/www.truprint.co.uk
Powered by HP, Snapfish is one of the more user-friendly sites we've looked at. As both Snapfish and Truprint sites use the same server and print service, we've chosen to look at them together.

Uploading is easy, although there is no software utility as there is on other sites. You can only select 12 photos at any one time, which might make this a long-winded process if you're uploading holiday footage from a week away. After you've created your album, you can access a large number of image tools, including captions and borders. If needed, photos can also be enhanced with tints and red-eye reduction.

Prints are cheap at only 10p each and the sites also have a unique prepay function, where you can pay £45 for 500 prints. This is a good option if you're likely to develop lots of photos within a reasonable timeframe as you'll save more money, however if you are a light user it's unlikely to be of benefit. When you refer friends to the service, you get 20 complimentary prints.

Postage is a flat price of 99p which is makes the total price from either of these sites affordable. Our prints were delivered within 36 hours and were on high-quality paper. However, the colours in some of the photos seem enhanced, making them appear unnatural or too saturated. There are also some blemishes and loss of detail, which weren't apparent on the originals. This didn't look too bad from a distance but was noticeable on closer inspection.

T-Mobile Kodak Mobile
www.t-mobile.kodakmobile.co.uk
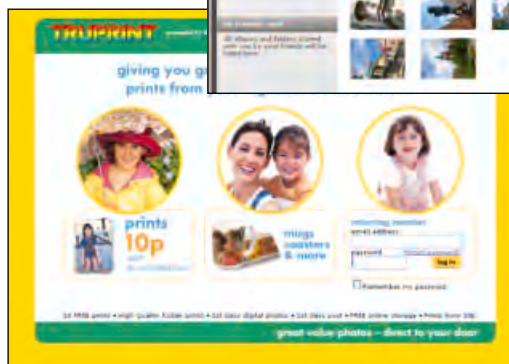T-Mobile has teamed up with Kodak to provide a new printing service, which includes photos taken with

Alternative services

Other online photo-sharing services worth mentioning are Flickr and Google's free picture organiser Picasa. Flickr (www.flickr.com) offers a multitude of options for sharing your photos, although there is no print service available. Photos can be uploaded either manually from the site or by downloading the utility Uploadr. Photos can be arranged into separate albums and descriptions added for every image. There is also a blog option so people can comment on your photos. Albums can be set as either private (requiring those invited to register to use the email address you've specified) or public, which means that anyone can view your photos.

Picasa (www.picasa.com) is a great help if you've got hundreds of photos stored in various folders on your PC. Every time you open the application, it automatically locates every picture on your computer and organises them into albums. To arrange your albums, all you have to do is drag and drop your snaps and make labels to create new albums and groups. The service also offers basic image-editing tools, such as cropping, red-eye removal, tuning and effects such as sepia, film grain or soft focus. There's even an 'I'm feeling lucky' option which offers a one-click fix for lighting and colour.

	FLICKR	PICASA
URL	www.flickr.com	www.picasa.com
Online gallery	✔	N/A
Storage space offered	Unlimited (20MB monthly upload limit)	✔
Image-editing tools	Cropping and rotating tools only	✔
Burn to CD	✗	✔
Personalised gifts	✗	N/A
Pros	Numerous options and features such as blogs	Automatically scans for new images; plenty of functions; intuitive
Cons	No printing service	Multitude of options available is slightly overwhelming
Score	★★★★☆	★★★★☆

Right: Share photos from your cameraphone with T-Mobile Kodak Mobile

Above: Uploading was easy on Truprint and prints are cheap

Left: At 12p per print, Pixum offers the cheapest service on test

cameraphones. The site is easy to use and you can store, edit, share and print photos located on your phone. You need to register your phone on either the web or the Wap site, depending on which service your phone supports. To upload photos, just attached it to an email or MMS and send this from your phone to the website. A couple of ticks later, the snap will appear on the site.

It also works vice versa, if you'd like to send a photo taken using a digital camera to your phone, to set as wallpaper for example. Costs are your standard network rate, plus 20p for every MMS sent from your handset and £1 for every photo transferred to your phone. A preview of what the photo will look like will be shown before you get to the order page.

To order prints of your camera phone snaps, you'll be taken to the Kodak Gallery site, which works as explained in the Kodak Easyshare Gallery review. Photos taken with a cameraphone are never going to look great on paper due to the low resolution, so this site is really about sharing your mobile and camera snaps with friends and devices and for that use, it is a great site.

Editor's choice

Comparing the photos from all the services on test here, it is clear there is not a great deal of difference between the photos. Depending on your own preferences and how trained your eye is, it is difficult to say which services offer the best prints (after all, that's what matters the most). Although it was a close race between some of the sharing sites, we have picked three we think deserve recognition in terms of services on offer, price and quality.

Our **Editor's Choice** award goes to **Fotango**, which produced well-saturated prints with true colours and a good level of detail. With no limit on the number of photos you can upload to your gallery, it is also an excellent choice for sharing your snaps, even if you're still using a film camera. It is a little pricey compared to some of the other services, but we think the quality of the prints justifies the higher price tag.

Our first **Highly Commended** award goes to **Jessops**, which offers the benefit of no delivery charge if you choose to pick up your photos from one of its shops. If you often order large quantities of photos, this should prove to be the best value for money and good quality. The photos were printed on high-quality paper with a good level of detail that was pretty close to that produced by Fotango. Online storage is limited, though, so you have to be selective on what photos you'd like to share with others.

We were also impressed by **Kodak Easyshare Gallery** – it offers unlimited storage space so is ideal for keen photographers and there are a multitude of image-editing tools on offer. The site is user friendly and intuitive and there is a great Help section if you have any queries. The prints arrived quickly, were good quality and came at a reasonable price tag, so deserves to win our second **Highly Commended** award.

Table of features

SERVICE	BONUSPRINT	CANON IMAGE GATEWAY	FDIPRINT	FOTANGO	JESSOPS
URL	www.bonusprint.co.uk	www.cig.canon-europe.com	www.fdiprint.com	www.photos.fotango.com	www.jessopsphotoexpress.com
Online gallery	✗	✔	✗	✔	✔
Storage space offered	N/A	100MB	N/A	Unlimited	70MB
Image-editing tools	Cropping tools	Red-eye removal, cropping, rotating	As part of the downloadable application	Rotating, cropping	✗
Cost of burning to CD	£1.99	£4.99	✗	✗	£2.99
Personalised gifts	Mugs, jigsaws etc	Posters, stickers, canvas prints, keyrings etc	✗	Mugs, calendars etc	Teddy bears, t-shirts etc
Cost per print (6 x 4 glossy) inc VAT	12p (1-49), 10p (50-99), 9p (100+)	15p	25p	49p (1-9), 44p (10-19), 37p (20-39), 24p (40+)	25p (1-99), 15p (100+)
Delivery charges inc VAT	£1.20	£1.50	£1.95	£1.07+ (depending on weight)	£1.50 or collect in-store free
Pros	Cheap; decent quality; no frills	Good selection of editing tools	Good image-editing options	Fast delivery; good print quality; loads of options; scans film photos	Choice of delivery; well-detailed photos
Cons	Limited options; no photo-sharing features	You must have a Canon camera	Expensive and slow delivery; poor print quality	Expensive	Complicated interface
Score	★★★☆☆	★★★☆☆	★☆☆☆☆	★★★★★	★★★★☆

SERVICE	KODAK EASYSHARE GALLERY	PHOTOBOX	PIXUM	SNAPFISH/ TRUPRINT	T-MOBILE KODAK MOBILE
URL	www.kodakgallery.co.uk (formerly ofoto.co.uk)	www.photobox.co.uk	www.pixum.co.uk	www.snapfish.co.uk/ www.truprint.co.uk	www.t-mobile.kodak mobile.co.uk
Online gallery	✔	✔	✔	✔	✔
Storage space offered	Unlimited	200MB (plus 50MB for each order placed)	200MB	Unlimited	Unlimited storage
Image-editing tools	✔	Rotating, cropping	Rotating and cropping only	Borders, captions, rotate, flip, cropping, enhancing, red-eye	Add borders and captions; rotate and flip; zoom in/out
Cost of burning to CD	✗	£4.99	✗	✗	✗
Personalised gifts	Greeting cards only	Mugs, calendars etc	Mugs, playing cards, stickers, calendars etc	T-shirts, greeting cards, posters etc	Greeting cards
Cost per print (6 x 4 glossy) inc VAT	19p	18p	12p	10p (or prepay £45 for 500)	19p
Delivery charges inc VAT	99p+ (depending on weight)	£1.50 (up to 2kg)	£1.90	99p	99p
Pros	Good print quality; cheap; plenty of editing tools	Fast delivery; mobile options	Cheap; fast delivery; plenty of upload options	Easy to use; quick delivery	Cheap; plenty of editing tools
Cons	Photos can't be viewed at full size online	Flimsy paper; limited storage	Limited storage space; jagged edges on photos	Manual uploading only; poor colour and detail reproduction	Interface could be more user friendly
Score	★★★★☆	★★★☆☆	★★★★☆	★★☆☆☆	★★★★☆
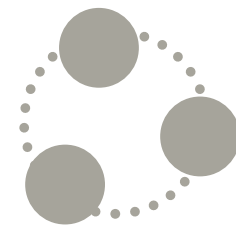
Network

Contents

IM for Office

Office Communicator 2005, which integrates instant messaging (IM) and web conferencing into Microsoft Office, should be available by the time you read this. Firms with Enterprise Agreement licences will get it as part of their monthly update; it will also be available as a download.

Office Communicator 2005 replaces Windows Messenger 5.1 as the preferred realtime client and is designed to complement Microsoft's Live Communications Server 2005. It can interoperate with other services and Microsoft says it provides all the advantages of IM without the security issues.

HP in Eden

HP has selected Via's low-drain Eden Platform processors to power its forthcoming range of thin clients. The Eden ESP ultra-low-power chip will used the Compaq t5125, t5520 and t5525 thin clients. The move follows Transmeta's decision to drop its low-drain Crusoe chip. Eden boards are fanless, with 128MB of Ram and up to 256MB of Compact Flash memory.

New aerials

Linksys has launched some high-gain antennas to boost the range of Wifi networks using its routers. One type works with models WRT54GS, WRT54G, WAP54G, BEFW11S4 and WAP11 and the other with single-antenna devices WRV54G, WMP54GS, WMP54G and WET54G.

New deals on remote access

Free GotomyPC rivals hit the market in a bid to cash in on success

Two companies are offering free secure remote access for private users, in a bid to cash in on the success of GotomyPC, now owned by Citrix. Both Webex and 3am Labs' Logmein allow you to view and control a remote PC, even if it is behind a firewall.

But the free versions fall short of GotomyPC's virtual private network-like features such as the ability to transfer files directly between the local and remote machines.

Brett Caine, president of Citrix Online, says there has been an explosion in the use of GotomyPC, due to word-of-mouth recommendations and he isn't worried about rivals.

'The free versions don't offer all the facilities we do and it isn't clear how long they will be able to continue without charging. You need to spend a lot of money to provide a resilient, secure service.'

GotomyPC allows individual users to bypass IT departments to gain facilities similar to those

of a VPN, so some companies may have signed up to the corporate version to retain control of security. The GotomyPC link may be secure enough, but administrators will want to be sure of the client machines accessing their system.

Caine said he had heard of no problems with keyloggers collecting log-on data but said the system does give you the option of one-time passwords.

Citrix Online is offering two related products, Gotomeeting

and Gotoassist. The entry-level Gotomeeting first allows you to host any number of online meetings of up to 10 people for from $39 (£21 approx) a month. 'Other services of this kind charge you by the minute. Our offer gives you much more freedom,' Caine said.

Gotoassist allows support desks to diagnose and sort out problems remotely.
http://logmein.com
www.mywebexpc.com
www.gotomypc.com

Security hype 'stifling new technologies'

Companies are failing to implement key technologies such as IP telephony and wireless networking, because the security risks have been exaggerated, according to analysts Gartner.

'Many businesses are delaying rolling out high-productivity technologies, because they have seen so much hype about the potential threats,' said principal analyst Lawrence Orans.

He added that the benefits of IP telephony far outweigh any security risks.

Gartner Fellow John Pescatore predicted that malware would

be little more than a 'niche nuisance' in business use of smartphones and PDAs, yet anti-virus companies would try to cash in on what they saw as a huge potential new market. 'However, device-side anti-virus for cellphones will be completely ineffective,' he said.

But McAfee security expert Sal Viveros said: 'Network protection is a must, but you also need it at the device side itself if you're going to stop infections.'

Pescatore also dismissed the risk from wireless hotspots, as long as companies provide the training and security tools.

Mobile users should seek out 802.1X protected access points because they facilitate encryption between the mobile endpoint and the access point.

'Mobile users in hotspots should utilise their corporate VPN (virtual private network) connection to protect traffic as it travels through the Internet,' said Pescatore. 'They should use personal firewalls and turn off file/print sharing to protect their endpoints from data theft.'

For more on this story, go to **www.pcw.co.uk/2137762**.
Robert Jaques

Can Apple make Intel's dreams come true?

Kelvyn Taylor argues that Apple's move to the Intel platform may herald a new lease of life for an industry in dire need of innovation

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> **'Apple has a foothold in every area Intel sees as important for its future processors'**

Forget the squeals and protests of the Mac diehards – last month's news of Apple's move to the Intel platform marks a major turning point in the PC industry. It's exactly what's needed to breathe some new life into a sector stifled of innovation.

What's more, Apple is absolutely right to state from the outset that Mac OSX will only run on Apple hardware – in fact that's one of the keys to the whole shebang in my view.

As I see it, Apple's specific choice of Intel (rather than just x86) is significant, and anyone who was at the Intel Developer Forum (IDF) in San Francisco earlier this year or who has read any of the coverage of that event should be able to see why – and I'm not talking about the economics of the switch here.

The problem is that the Intel of 2005 is getting frustrated. It has spent a lot of time and money researching and developing increasingly clever ways of processing silicon. It has come up with a roadmap that foresees powerful multiple core processors with hugely improved power consumption, enabling products that get even closer to the *Star Trek*-fuelled dreams of its engineers, yet no-one seems to want to share those dreams.

Intel is hopeless at designing PCs, yet at every IDF it trots out a few tacky 'concept' models in the forlorn hope that some system builders will latch on to the dream. But they rarely do, as the large system builders are all in the game of producing commodity hardware at rock-bottom prices. Elegant engineering exercises such as BTX are promptly ripped to shreds in the interests of making them work in volume manufacturing.

Then along comes Apple, a design-led lover of technology that's managed to make some distinctly second-rate hardware look amazingly sexy, and that's developed probably the coolest-looking operating system on the planet. It cares about its hardware, won't let anyone make clones, and makes plenty of profit out of its expensive systems.

It's exactly what Intel needs to help it push and promote its visions of new uses of computing, and Apple has a foothold in every area Intel sees as important for its future generations of processors – medical and scientific computing, consumer electronics, servers, laptops and desktop PCs. Forget the G3 Mac Mini, say hello to a quad-core home media server. Or a desktop system capable of running virtual Windows as fast as a Windows-only PC. Or a laptop that will run for a full 12 hours.

Without this kind of far-reaching vision from companies such as Intel and Apple, the PC industry is in danger of disappearing up its own bill of materials, which in the end benefits no-one except the people making the materials or generating the bills; certainly not you or me, who have to live with the unimaginative results. ■

Microsoft offers mobile email

Microsoft will add Blackberry-style mobile email access to its Windows Mobile 5 platform for handhelds and smartphones later this year. Updated code will ship in October with Service Pack 2 for Exchange 2003, which will add the necessary support into the groupware server product.

The Messaging and Security Feature Pack for Windows Mobile 5 will enable direct push delivery of email, calendar, contacts and tasks information from Exchange 2003 to users' handsets. It will also improve security and give IT staff better management control over such devices.

Microsoft said the update delivers the same experience as other push email systems, but without the expense of an additional relay server and extra client licences required by many third-party systems.

'The headline is we're enabling flexible, scalable messaging for customers,' said Jason Langridge, Microsoft's UK Mobility business manager.

Administrators will be able to lock a client device or wipe all data after three incorrect password attempts. A digital certificate stored on the handset provides additional security. Users will be able to look up addresses on the company directory.

Windows Mobile 5 is getting Blackberry-style mobile email

Microsoft acknowledged that most customers will still be running older versions of Exchange Server, but said the new capabilities were a compelling reason to move to Exchange 2003 SP2. 'If you look at the benefits of scalability and security, it's a good reason to upgrade,' Langridge said.

Customers buying Windows Mobile 5 handsets between now and October will also be able to upgrade them over the air via their carrier or handset maker, Microsoft said.

Daniel Robinson

Buffalo Wireless Gateway

Access your PCs when away from the office

Remotely accessing office PCs via the Internet would benefit most small businesses. Services such as GotomyPC (**www.gotomypc. com**) offer an effective web and software-based method, but you have to fork out a subscription fee. Buffalo's Wireless Secure Remote Gateway is a hardware alternative requiring a one-off outlay of £149.

The device uses a secure VPN (virtual private network) connection along with Buffalo's remote access software to set up a link to your networked PCs. Once the connection is established, you'll be able to access the desktop of your various PCs via the Internet.

This is much more than just a remote access device. As well as being an 802.11g wireless access point and four-port 10/100 Ethernet switch with a Wan port, the router can operate in Buffalo's 125 High Speed Mode. This uses Broadcom's Afterburner technology to talk to other Afterburner wireless devices at a claimed 125Mbits/sec. As with all wireless connections, theoretical and actual speeds differ, so expect throughput of around 35-40Mbits/sec in good conditions.

The web-based interface means setting up the device should be problem-free. Wireless security

configuration is simple with Buffalo's AOSS (Airstation Onetouch Secure System). By pressing a button on the device it will securely connect to other AOSS wireless kit with no need for Wep (Wired Equivalent Privacy) keys and SSIDs (Service Set Identifiers). The device is also Wake-on-Lan-compatible, so you can remotely turn on suitable PCs attached to the four-port switch.

Clearly aimed at small businesses, this is a great piece of kit if you want to remotely accessing the PCs on a network.
Will Stapley

DETAILS

PRICE £149 (£126.80 ex VAT)
CONTACT Buffalo 01753 555 000
www.buffalotech.co.uk
SPECIFICATIONS
4-port 10/100 Ethernet switch • 802.11b/g • WPA/Wep security • Nat/SPI firewall • Wake-on-Lan • DHCP
PROS Remotely access PCs; good security
CONS Over-ambitious speed claims
VERDICT
A secure way of accessing your PCs when you're away from the office, but ignore the claimed wireless speeds

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
ENTERPRISE VALUE	★★★☆☆
OVERALL	★★★★☆

Toshiba Portégé M300

Tough build with impressive battery life

The Portégé M300 is a lightweight laptop, with features, such as an impressive battery life, designed to appeal to mobile executives. Our review model was based on an ultra-low voltage 1.2GHz Pentium M with 512MB of Ram, 60GB hard disk, 12.1in TFT screen and a built-in DVD-RW drive.

The system has been toughened to survive life on the road and Toshiba has included a number of software tools to help users make wireless connections, secure the device and recover from disasters. The Portégé M300 includes built-in shock protection around its hard disk and a sensor that lets the system park the disk heads if it detects sudden motion – such as if the laptop were dropped. The sensitivity of the motion sensor can be adjusted using a system tray applet, which also pops up a message if the protection is triggered. Toshiba has used magnesium alloy to protect vital parts of the system, such as the lid containing the screen.

The 1.6kg Portégé M300 has an impressive battery life: in our battery benchmark, it lasted four hours and 56 minutes with all power management disabled, making Toshiba's official quote of six hours seem conservative.

Ultraportables often fall down when it comes to performance, but the Toshiba bucks the trend. With its 1.2GHz processor, the Portégé M300 is a powerful machine that is more than capable of running business applications.

The Portégé M300 comes with three USB and one Firewire port, as well as a PC Card slot and card reader for Compact Flash (CF) and Secure Digital (SD) cards.

Overall, it's a quality notebook that will withstand life on the road.
Daniel Robinson

DETAILS

PRICE £1,408.33 (£1,199 ex VAT)
CONTACT Toshiba
0870 444 8943
www.toshiba.co.uk
SPECIFICATIONS
1.2GHz Pentium M • 512MB Ram 60GB hard disk • Intel 855GME integrated graphics • DVD-RW • 3 USB • 1 Firewire • PC Card slot • 802.11b/g • Card reader
PROS Battery life; robust
CONS Relatively slow processor
VERDICT
Tough enough to survive life on the road and has impressive battery life

FEATURES	★★★★★
PERFORMANCE	★★★★☆
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★☆

POWER OVER ETHERNET SWITCH

Netgear Prosafe FS108P

A simple way to add power to your network

Aimed at small businesses, Netgear's Prosafe FS108P is an unmanaged eight-port switch that supports Power over Ethernet (PoE). As well as working as a standard switch, it allows you to add wireless access points and IP surveillance cameras to a network without having to find a spare mains outlet for each device.

The switch can provide power and data together over a single Cat5 Ethernet cable to products that support the IEEE 802.3af standard. Only four out of the eight ports are PoE enabled, although this should be sufficient for most small home or office installations and devices can be positioned up to 100m away.

Each port automatically detects compliant devices and will only supply power as required, so if you plug in a non-PoE device you're not going to damage it. A total of 32w is available across the four ports, with the standard allowing for a maximum of 15.4w per port.

As with other Netgear products, the Prosafe is encased in a compact, solid metal casing, and its fanless design helps to keep noise levels down. It can be used freestanding on a desk, or wall-mounted to keep it out of the way. The front features the usual array of LEDs

for reporting activity or faults, with sets for both the data switch and the PoE ports. A separate LED warns if you have reached the maximum power output.

Overall, the Prosafe FS108P offers a simple way of incorporating PoE into your network. Products like this can help substantially reduce the cost of installing remote devices and are becoming increasing popular. Its only downfall is the lack of Gigabit Ethernet.

Alex Arias

DETAILS

PRICE £99.99 (£85.10 ex VAT)
CONTACT Netgear 01344 397 021
www.netgear.co.uk
SPECIFICATIONS
8 auto-speed-sensing 10/100 RJ-45 ports (4 PoE) • 802.3af power consumption: 32w maximum (Ports 1–4) • 27 x 235 x 103mm (h x w x d) • Store-and-forward switches • P IEEE 802.3i 10Base-T, 802.3u 100Base-TX, 802.3af DTE Power via MDI, 802.3x flow control
PROS Robust; scalable
CONS No Gigabit Ethernet
VERDICT
A great solution for delivering power to remote devices

FEATURES	★★★★☆
PERFORMANCE	★★★★★
ENTERPRISE VALUE	★★★★☆
OVERALL	★★★★☆

NETWORK STORAGE DEVICE

Nexon NAS1000

No-nonsense, feature-rich Nas appliance

Nexon's NAS1000 is a storage device targeted at small to medium-sized companies, and is one of the smallest terabyte Nas (network attached storage) appliances we've reviewed.

Internally the unit comprises four easily accessible Sata (Serial ATA) 250GB Western Digital hard drives, which can be set up using hardware Raid levels 0, 1 and 5. The Nexon has its own embedded operating system, NexOS, stored on a Compact Flash module, accessed through an uncluttered browser-based user interface.

Installation is straightforward in a DHCP environment and we configured the Nexon NAS1000 in a matter of minutes. There's support for both a Windows Domain or a normal workgroup, and user and group-level permissions for network shares can be set along with disk space quotas for individual users.

Connection to the network is with a Gigabit Ethernet port, which should provide sufficient bandwidth for the most demanding of networks. In addition, support for all the major file sharing protocols means the Nexon fits seamlessly into heterogeneous environments. A single fan means the unit is quiet in operation, which would suit a home office setup.

Two USB ports allow external devices to be connected. A list of compatible devices can be found at **www.thenexon.com**.

Extra performance parameters can be tweaked, and SMNP and SMTP support provide alerts if problems arise. The unit has UPS monitoring and snapshot backups can be scheduled.

There are cheaper products on the market with a terabyte of storage, but the NAS1000's features make it better suited to a range of business networks.

Alex Arias

DETAILS

PRICE £998.75 (£850 ex VAT)
CONTACT Nexon Technology 020 8002 9693 **www.thenexon.com**
SPECIFICATIONS
Gigabit Lan Ethernet port • Hardware Raid, 0, 1 and 5 • 4 250GB Sata hard disks • SNMP MIB-II • 2 USB2 ports • Microsoft Network (CIFS/SMB3), Appletalk (AFP3.1), Internet (HTTP1.x), Unix/Linux (NFS 3) • 200 x 270 x 220mm (w x d x h)
PROS Good support for mixed environments; highly configurable
CONS Not the cheapest option
VERDICT
A solid, business-class Nas appliance with plenty of features

FEATURES	★★★★★
PERFORMANCE	★★★★☆
ENTERPRISE VALUE	★★★★☆
OVERALL	★★★★☆

WORDS: DAVE MITCHELL

Wider horizons

The cost of replacing or upgrading a Wan can be high, but you can get more out of your existing setup using a different approach and one of these devices

Networking speeds on local area networks (Lans) may have increased exponentially over the past few years, but wide area network (Wan) capacities have failed to keep in step. While Lans can now take advantage of low-cost Gigabit Ethernet, for example, Wan connection speeds rarely exceed 2Mbits/sec.

Yet the amount of business data moving from the Lan to the Wan has increased dramatically and the causes are manifold – distributed applications, server consolidation and the convergence of voice, data and video over IP to name but a few.

Users' attitudes and habits have also changed since the Internet became part of everyday working life. Increased reliance on email and unmonitored non-business-related activities can wreak havoc on Wan performance. A report by analysts Gartner in 2003 estimated that enterprise Wan bandwidth requirements will continue to grow at 30 to 50 per cent a year.

Upgrading a Wan is by no means as simple as increasing Lan capacity, however, and the costs alone can be prohibitive – so much so that expenditure on a Wan represents a significant investment for the majority of enterprises.

Instead of increasing Wan capacity, it makes good business sense to squeeze more out of existing connections, and deploying Wan optimisation appliances is one way to do it.

This group test looks at three of the best Wan optimisation appliances currently on the market, with

each taking a different approach to reducing Wan traffic. Peribit's family of Sequence Reducers uses unique features including molecular sequence reduction (MSR) for traffic pattern matching, for example, as well as packet flow acceleration (PFA) to improve application response times.

Net Intact's Packetlogic PL2 and Packeteer's Packet Shaper 6500 focus on Layer 7 traffic inspection, allowing administrators to identify specific data packets and use prioritisation techniques to allocate bandwidth to the applications or processes that need it most.

Wan optimisation appliances are often thought of as being expensive to buy and deploy. However, if the devices are configured properly, that investment can be more than adequately returned if compared with the cost of leasing a faster Wan connection from a carrier or service provider.

Net Intact Packetlogic PL2

The Packetlogic PL2 appliance from Swedish company Net Intact offers a good range of sophisticated traffic management facilities, including surveillance, traffic shaping, firewalling and statistics. Its modular approach also allows it to be customised to suit any environment and be easily upgraded. Firms can start off with the base unit and add new features as and when required.

The device is very easy to install because it functions as a transparent gateway and slots neatly in between the Lan and Wan connections, meaning administrators do not have to reconfigure any clients.

Net Intact offers Fast Ethernet and Gigabit Ethernet Lan and Wan options but is also targeting smaller businesses with lower-cost 10Mbits/sec and 4Mbits/sec versions priced at about £4,500 and £7,000 respectively for unlimited user licences. The price for the system we reviewed includes all modules activated, support for 100Mbits/sec Wan connections and a licence for 128 IP addresses.

The system provides realtime traffic statistics, but web browser remote access is not supported because Net Intact feels Java-based applications are too slow. Instead the device is accessed via a Packetlogic client utility that uses 256bit Secure Sockets Layer (SSL) encryption designed for enhanced performance and a secure link to the appliance.

The client interface is easy to navigate and the network surveillance component provides a detailed analysis of

The Packetlogic PL2 from Net Intact offers excellent firewalling and traffic management capabilities, and is reasonably easy to configure

inbound and outbound traffic, allowing bandwidth usage to be viewed by local host, application protocol and VLan connection.

Each local network needs to be declared to the appliance, but once this is done all active hosts on the selected subnet are revealed. Selecting an 'entry in' table allows administrators to drill down to see all host and client connections and their properties. When, for example, a user is downloading a file you can see the server and client IP addresses plus hostname, port and service, while a separate table reveals packet statistics, traffic direction, URL and the name of the file being transmitted.

Basic protection is provided by a stateful packet inspection (SPI) firewall, but the appliance goes further by using full Layer 7 inspection, allowing it to identify potentially suspect traffic such as peer-to-peer file-sharing, games, chat and audio or video streaming.

Traffic is controlled and prioritised according to a system of objects, items and rules. Top-level objects represent entities such as networks, services, ports, time intervals, traffic shaping and VLans, while customised objects and items can be added.

To describe a physical network, a new Netobject is created with the editor tool, which adds items for IP addresses, address ranges and subnets to include and exclude. The same procedures apply to creating Service Objects, with a huge list of predefined services provided. For Shaping Objects, network managers specify parameters that determine available inbound and outbound Wan bandwidth, while the option to 'borrow' bandwidth from another shaping rule if it is being under-utilised is a useful feature.

Packeteer Packet Shaper 6500

Packeteer is an established and well-respected vendor of Wan optimisation tools and its Packet Shaper range offers a wide choice of features and capabilities. The devices are all based on the same code, making it easier for network managers to choose the model that best suits their needs.

The Packet Shaper 6500, for example, targets mid-sized businesses with Wan links up to 100Mbits/sec. It comes with 10/100BaseTX Lan and Wan ports as standard but offers a pair of expansion slots for additional Fast Ethernet links. The basic model functions in standalone mode and, as with the Packetlogic PL2, offers full Layer 7 inspection along with traffic classification and bandwidth management. This device is much more versatile when used as one of a pair of appliances that can then implement an optional traffic-compression feature, however.

The 6500 also functions as a transparent gateway, which makes installation simple, and all management access is via an intuitive browser interface. Packeteer also makes it easy to use by allowing administrators to specify which traffic classes are critical and which are not, before leaving

Packeteer's Packet Shaper 6500 uses partitions to manage bandwidth so critical applications are guaranteed to get most capacity while bandwidth for less important traffic is limited

DETAILS

NET INTACT PACKETLOGIC PL2
PRICE £12,242 (£10,419 ex VAT) with two analogue ports
CONTACT Metropolitan Networks 01689 885 031
www.netintact.com
PROS Excellent surveillance capabilities; powerful traffic shaping; easy installation; modular design; secure client access; good overall value; excellent hardware specification
CONS Data export options used to be a weakness but a new Python API should improve things
VERDICT
Better value than the Packet Shaper 6500 with an equally impressive range of traffic management tools, although reporting is not as good and it is not quite as easy to use

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

PACKETEER PACKET SHAPER 6500
PRICE £16,450 (£14,000 ex VAT)
CONTACT Packeteer 01252 761 199
www.packeteer.com
PROS Easy installation and configuration; good wizard-based assistance; unrivalled traffic management features; optional compression capabilities
CONS Expensive; low hardware specification
VERDICT
The Packet Shaper 6500 from Packeteer is the easiest to use of the three appliances we reviewed for this group test, and is a very versatile device that offers excellent traffic management features

it to the Easy Configure tool to automatically set up basic traffic-shaping policies.

TCP Rate Control is another useful feature, allowing the appliance to reduce latency on connections between clients and servers. It monitors acknowledgements (Acks), changes the window size for each one and times their release to reduce queuing and potential packet loss.

Traffic must be classified before the device is ready to start monitoring, this being carried out automatically. Administrators can manually add their own classes allowing very specific traffic to be identified by IP address, URL, hostname or just a web page, for example.

The 6500 uses a simple concept of partitions to manage available bandwidth, so critical applications are given the most capacity while resources available to less important traffic are reduced. Non-business applications can be blocked or, as with the Packetlogic PL2, allowed to pass but with so little bandwidth that users are deterred from trying to run them at all.

The 6500 comes out on top for the number of management features it provides. Bandwidth can be allocated to selected users or groups, and resources can be guaranteed on a per-session basis. Priority policies can also be set to allow non-business applications to be used only when spare bandwidth is available.

The web interface is easy to use and opens with a status report on all active components, posting alerts if hardware problems are detected. Each function is accessed from a neat row of tabbed folders with the first providing a rundown on general Wan usage and the top 10 active applications. Plenty of help is provided and good graphing facilities give information on inbound and outbound traffic rates. The Monitor tab also provides a complete list of all discovered applications and displays average and peak rates for each one.

Packeteer has pulled out all the stops to make Wan traffic management as simple as possible and the 6500 provides a wealth of easily accessible features. Nor can its reporting capabilities be beaten – plenty of predefined reports are provided and the appliance can store up to two months worth of data to identify trends.

Peribit SR-50 Sequence Reducer

Peribit takes a different approach to Wan optimisation than the other suppliers featured here. The SR-50 is aimed at Wan connections of up to 20Mbits/sec and offers a range of unique tools based primarily around traffic compression and latency reduction technology. As a result of this, two appliances, one at each end of the Wan link, are required.

One of Peribit's technologies is MSR, which it likens to DNA pattern matching. It looks for repeated patterns in the data flow and replaces them with labels, allowing it to reduce the amount of traffic sent over the Wan link. Another is packet flow acceleration (PFA), which coaxes the TCP source to send more data by increasing the TCP

How we tested

To get a feel for how well the Packet Shaper and Packetlogic appliances worked and how easy they were to install, we plugged them into a 2Mbits/sec Wan connection linked to a Lan comprising a variety of Windows-based servers and workstations. As their traffic inspection capabilities can be used in myriad scenarios, we did not run any specific performance tests but used a variety of everyday applications to see how well they coped.

We tested the Peribit appliance's traffic-reduction abilities by installing a pair of SR-50s in a closed network. We used a Windows Server 2003 system with two 10/100BaseTX network cards and placed an SR-50 on each side, each configured for different IP subnets. The server had routing enabled to allow traffic to be passed across the two subnets. We then placed Windows Server 2003 systems on the other side of each SR-50, allowing us to create a routed link from one end-server that passed through one appliance, through the central server, out to the second SR-50 and on to the other end-server.

For throughput testing we copied a variety of files from one end-server to the other and monitored progress from the routing server using the Windows performance utility counter log for the network connections.

Peribit's SR-50 device offers an impressive and unique range of Wan optimisation tools; and tests showed its reduction capabilities can significantly improve Wan performance

packet receive window size. Also called flow pipelining, this can be applied to specific applications, effectively giving them more bandwidth than others.

A third technique is active flow pipeline (AFP), which terminates TCP sessions locally and uses more reliable and efficient transport protocols between a pair of appliances to improve overall Wan performance. SR-50 appliances can locally acknowledge session requests for active destinations, so applications such as Server Message Block (SMB) that have short session times can have their responses improved.

In addition, quality of service (QoS) features extend to controlling outbound traffic by guaranteeing bandwidth to specific applications and prioritising inbound traffic. Installation takes a little longer than with the other devices, but is helped by plenty of wizards. An IP address can be assigned manually to each appliance from the front control panel and the browser-based remote management interface is well designed and intuitive.

A wizard helps set up QoS parameters and PFA, which requires information about the units performing this

PERIBIT SR-50
PRICE £4,700 (£4,000 ex VAT)
CONTACT Peribit 0118 949 7044
www.peribit.com
PROS Effective Wan performance improvements; easy setup with good wizard-based help; good documentation; inexpensive; plenty of reporting tools
CONS No security features
VERDICT
Comparatively easy to install and use, the SR-50 from Peribit is an unusual system that offers a range of unique capabilities designed specifically to maximise Wan bandwidth

function and the applications that are to be accelerated. Traffic reduction options are extensive, allowing administrators to select appliances that are allowed to reduce data before sending it to another unit, and those that can assemble received data.

We tested the SR-50's capabilities by creating a reduction tunnel between two devices installed on our network; a simple process as the partner can be chosen from a list of discovered devices.

Two tunnels need to be created; one for incoming data to be reassembled and the other for reduced data being sent out. The web interface shows whether a tunnel has been successfully created, and its status.

For our first test we copied a large mixture of files, first with no reduction selected and then again with a reduction tunnel established. Overall, we saw a performance improvement of between seven and 10 per cent. Next, we transmitted a set of compressed files over a normal network link in 122 seconds. With MSR turned on the time dropped to only 90 seconds – a 35 per cent improvement.

The SR family of appliances offers an impressive and unique range of Wan optimisation tools and our tests showed that their reduction capabilities can significantly improve Wan performance. Reporting facilities are up with the best and the appliances are as easy to install and configure as conventional traffic management boxes.

Editor's Choice

During testing we found each appliance to be relatively easy to install and configure, with minimal disruption to network traffic. Both Net Intact and Peribit provide in-depth documentation and plenty of assistance, although Packeteer has made the best effort to ensure traffic management is as painless as possible. For reporting and performance data retrieval the Peribit and Packeteer devices delivered the best features, with Net Intact's offering more rudimentary capabilities.

Enterprises looking for general Wan performance improvements will find Peribit can significantly improve general utilisation of Wan capacity. However, for more precise control of specific applications they should look towards Net Intact and Packeteer. Although the most costly of the three appliances, we found **Packeteer's Packet Shaper 6500** offered the best features with an impressive range of management capabilities and top-quality reporting, and therefore wins our **Editor's Choice** award. ∎

Table of features

For the best Wan device prices go to www.pcw.co.uk/bestprices

MANUFACTURER	NETINTACT	PACKETEER	PERIBIT
MODEL	PACKETLOGIC PL2	PACKETSHAPER 6500	SR-50
Price inc VAT (ex VAT)	£12,242 (£10,419)	£16,450 (£14,000)	£4,700 (£4,000)
Sales contact	01689 885 031	01252 761 199	0118 949 7044
URL	www.netintact.com	www.packeteer.com	www.peribit.com
CHASSIS			
Type	1U rackmount	2U rackmount	2U rackmount
Network ports	Two 100/1,000BaseTX	Two 10/100BaseTX	Two 10/100BaseTX
Wan capacity licence	100Mbits/sec	100Mbits/sec	20Mbits/sec
HARDWARE			
Processor type	Intel Xeon	Intel Pentium III	Intel Pentium 4
Processor speed	2.8GHz	850MHz	1.8GHz
Processors installed/max	2/2	1/1	1/1
MEMORY			
Type	PC2100	PC100	PC133
Ram fitted	1GB	512MB	1.5GB
HARD DISK			
Make/model	Seagate Cheetah	Quantum Fireball	N/A
Total capacity (unformatted)	36GB	30GB	N/A
Controller type	Ultra320 SCSI	ATA	N/A
FEATURES			
Layer 7 inspection	✔	✔	✗
Compression tunnels	✗	Optional	✔
Pattern matching	✗	✗	✔
Traffic shaping	✔	✔	✗
SPI firewalling	✔	✗	✗
MANAGEMENT			
Web browser	✗	✔	✔
Other	Packetlogic Client	✗	✗
Basic warranty	1 year RTB	1 year RTB	1 year RTB
SCORES			
Features	★★★★☆	★★★★★	★★★☆☆
Performance	★★☆☆☆	★★★★★	★★★★☆
Value	★★★★☆	★★★★☆	★★★★★
Overall	★★★☆☆	★★★★☆	★★★★☆

VoIP explained

It may be one of the hottest technologies in the consumer and business markets, but Voice over IP is still a mystery to many. Fear not, we're here to help as Alan Stevens answers some of the most common questions

Q What is voice over broadband? Is it the same as VoIP?

A Voice over broadband (VoB) is simply another (rarely used) term for the use of Voice over IP (VoIP) technology to make and receive phone calls via broadband DSL, cable or wireless Internet links. Instead of routing calls via a local telephone exchange, the voice signals are encoded and transmitted over the Internet alongside normal data.

Q Can VoIP reduce the cost of telephone bills?

A Always-on broadband services are, typically, unmetered, which means that using them to make calls to other VoIP users is effectively free. In addition, it is possible to cut the cost of calls made to the ordinary public switched telephone network (PSTN) by subscribing to a gateway service. PSTN gateway services include IPtelecomms.net, On Instant, On4, Pipemedia, Skype Out, Voipfone and Voiptalk. These use VoIP to make a call to the service provider, which charges a low fixed fee for onward transmission via the conventional telephone network.

Q How are incoming phone calls handled?

A Other VoIP users can call you directly if they know your IP address, but that's not particularly user friendly, so most systems now use a special signalling protocol called SIP (Session Initiation Protocol) to simplify the process. Here your IP address is mapped to a URI (Uniform Resource Identifier) that looks much like an email address and is a lot easier to remember and use.

For an extra charge most service providers can also allocate subscribers an inbound PSTN phone number, routed to their VoIP phone. This is usually a non-geographic number (starting with 0870, 0845 etc) although it can be geographic if preferred and doesn't necessarily have to reflect the location of the phone involved. For example, you might want a 'virtual' city number for your rural-based business.

Q What else does SIP do?

A SIP clients are typically a software or hardware phone, and are assigned a user name and password that is used to register their IP address with a SIP server whenever they are turned on and available to make or receive calls. The server can then direct incoming calls to that client, or make other arrangements, such as recording a voicemail message if the client is not available.

Most public VoIP services require SIP compatibility and many hardware vendors now provide such support as standard. One exception is where VoIP hardware is used to replace in-house PBX switchboard systems. Here different protocols are employed, although SIP support is becoming more common in these situations as well.

Q Can I run my own SIP server and what are the benefits of doing this?

A Commercial and open-source software is available to host the various SIP server components (the SIP registrar, proxy and redirect servers). Broadband routers with built-in SIP servers, such as the Intertex IX66, are also available. This enables even quite small companies to set up and manage their own private VoIP networks.

One benefit is the ability for a firm to use its custom SIP addresses. It can also host SIP services for others, although additional gateway hardware/software is required to link to the PSTN and that can be complex, costly and time consuming. Few companies can match the economies of scale that enable SIP gateway providers to offer low fixed call rates to their subscribers.

Q How much do SIP service providers charge and what do they offer business users?

A Some providers, such as Free World Dialup, are totally free but only let you make and receive VoIP calls. To connect to the ordinary phone network you usually have to subscribe to a paid-for service via a PSTN gateway and rates vary.

In general, most service providers charge a monthly subscription per user. Calls to other VoIP users are then

free – including to subscribers to other services – and you don't pay for incoming calls. However you will be charged per minute for outgoing PSTN calls, although rates compare favourably with ordinary phone tariffs, especially for long-distance and international calls.

Some SIP service providers also offer extra business-class services, such as voicemail and call forwarding between users. Some even offer fully fledged virtual switchboard facilities.

Calls can then be put on hold, forwarded from one user to another, to defined hunt groups and so on – just as on a PBX but without the associated hardware and management costs.

Q What extra hardware and software is needed?

A VoIP calls can be made using standard PCs equipped with either a microphone and speakers, plug-in headset or USB phone. A number of client software applications can be used including Windows Messenger with numerous other 'softphone' applications (such as the popular and free X-Lite) available for use on desktop, laptop and handheld PCs.

The softphone approach is attractive in that it doesn't cost much, but using a PC to make/receive calls isn't always convenient. Specialist IP phones that resemble more conventional telephone handsets are available and plug straight into the Ethernet Lan. Alternatively, adapters can be used to enable an ordinary analogue handset to be connected to the network.

Vendors have also recently begun to sell broadband routers with integrated VoIP phone ports, into which ordinary analogue phones can be plugged to make a simple integrated data/voice solution for teleworkers and remote offices.

Selected UK VoIP providers

www.freeworlddialup.com
www.intertexdata.com
www.iptelecomms.net
www.oninstant.com

www.pipemedia.com
www.voipfone.co.uk
www.skype.org
www.voiptalk.org

Some care is needed when buying hardware, however, as SIP support is far from universal. For example, some IP phones designed for use with specific PBXs cannot be used with most SIP services.

Q What happens if the network or broadband connection fails?

A If you can't connect to the Internet for any reason, such as a network hardware or service failure, you won't be able to make or receive VoIP calls. The same applies if there's a power cut as, unlike ordinary phones, VoIP hardware can't draw power from the phone line.

One solution is to retain at least one ordinary phone as a backup, although some of the latest VoIP products incorporate PSTN failover or emergency lifeline facilities. Disconnect the power to a router or adapter with this facility and the handset will revert to using the standard phone line to make and receive calls, with the ability to draw its power from the PSTN supply too.

When powered up, some of these devices also let you choose whether to make a conventional phone call or use VoIP by keying in special prefix codes before the number.

Q What can be expected in terms of call quality and reliability?
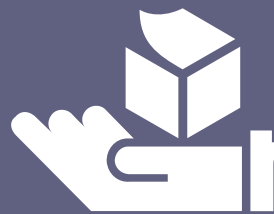
A In general, call quality is good and most people won't realise you are phoning them over the Internet. But call quality depends on a number of factors including available bandwidth and the way in which the voice signals are encoded. Specialised codec (coder/decoder) software converts voice signals to IP data packets and back again, with several ways of doing this. Some codecs, for example, compromise on quality to compress speech for transmission over very slow connections, while others maintain quality but consume more bandwidth as a result.

Codec choice is typically negotiated by the calling and receiving devices, but incompatibilities that prevent communication altogether can occur. These are increasingly rare, however, and mostly happen when calling direct from one VoIP client to another. Calls through SIP gateways are much more reliable, with call quality rivalling, if not exceeding, that of a conventional PSTN connection.

Q Apart from cost savings are there any other benefits?

A The ability to equip remote teleworkers and branch offices with virtual switchboards and telephone numbers is a major bonus with VoB. Not only does it help project a more professional image but it also enables co-workers to collaborate more easily.

VoIP technology also makes it easier to integrate voice and data together, for example, enabling customer information to be called up on screen as soon as a call is received. Mobility is another benefit worth noting. VoIP calls can be made and received wherever there's a suitable Internet connection. This might be through an office PC but equally, could be via a notebook, PDA or mobile IP phone connected to a wireless hotspot. ▪

VoIP glossary

Codec: The coder/decoder software used to convert analogue voice signals into data that can be transmitted using IP, and back again.

IP phone: An IP phone looks like an ordinary telephone handset, but instead of the usual connector it has a built-in Ethernet interface and a Voice over IP processor to encode the voice signals into IP data packets.

PBX: A local Private Branch Exchange linking multiple telephone extensions together and to the PSTN. Allows calls to be put on hold and forwarded between extensions, voice messages to be recorded, and music played on hold, among other features.

PSTN: The public switched telephone network or conventional analogue telephone system, as operated by BT and other telecoms carriers.

SIP: The Session Initiation Protocol is a signalling standard (RFC 3261) from the Internet Engineering Task Force (IETF) which makes it easier to locate and call VoIP users rather than 'dial' their IP addresses directly.

Softphone: Client software to enable VoIP phone calls to be made via the PC using either a microphone and speakers or a specialised headset.

URI: A uniform resource identifier is a user-friendly name that is mapped to the IP address of a VoIP phone to make it easier to remember and use.

VoIP: The Voice over IP technology whereby voice signals are converted into data packets, transmitted over the Internet, then converted back to voice at the receiving end.
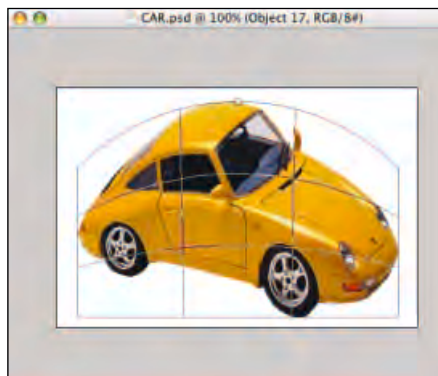
Hands on

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If you want to build a machine that saves on power consumption, discover which motherboard to use

PAGE 150

Find out what happened when we tested how far an Athlon 64 could be overclocked

PAGE 160

Check out Adobe's impressive Photoshop CS2 upgrade – you can't afford to miss out

Apple's Mac Mini caused a storm when it was released, but those who bought one quickly realised the high cost of official Apple hardware upgrades. Chris Cain was among them but, in true *PCW* Hands on style, he's discovered how to boost the hard disk capacity and memory using just a few simple (if rather unusual) tools. Read his step-by-step guide in our special feature on page 176.

Gordon Laing's never afraid to get his hands dirty either, and over the past couple of months he's been using Intel's mobile Pentium M processor to build his own low-powered desktop systems. This month in Hardware he puts it head to head with a rival system based on Via's Epia mini-ITX platform. In his companion Overclocking column, he looks at overclocking the Athlon 64.

According to Tim Anderson in Visual programming, Ajax is the latest buzzword in web application development, and he explains exactly why it's such a hot topic.

Ken McMahon is enthusing about the delights of Photoshop CS2 in the Digital imaging column, giving some hints and tips, and explaining what's new and why you should go out and buy it now.

If you've ever wondered how to set up a low-cost test server for web development purposes, Nigel Whitfield has the solution – the free Abyss X1 web server. He guides you through setting it up and using it.

In Spreadsheets, Stephen Wells continues his introduction to Excel Pivot Tables with a look at Pivot Charts. These easy-to-create charts give you a powerful, interactive way of visualising the data in your Pivot Tables.

There's a bumper-length Databases column from Mark Whitehorn where he covers several topics, from using yes/no tick boxes for reporting purposes, through to several reviews of books on ASP.Net.

In Windows, Tim Nott tells you all you need to know about the recent documents list in various versions of Windows, plus how to prevent Windows' thumbnail caching feature eating up the space on your hard drive. And in his Word processing column he looks at how to create pdfs for free from any Word document.

Finally, don't miss our usual four pages of Question time, where our experts take time out to answer as many of your email queries as they can.

Advice from our experts

Our Hands on experts answer your questions and solve your problems

Hardware

Q I am a keen flight-simmer and I cannot use my favourite Microsoft Sidewinder joystick with 9pin connector on my new HP Pavilion laptop which only has USB sockets. I have bought a Saitek Joystick with a USB interface but prefer my Sidewinder. Are there any adapters which will let me use it on a USB port?
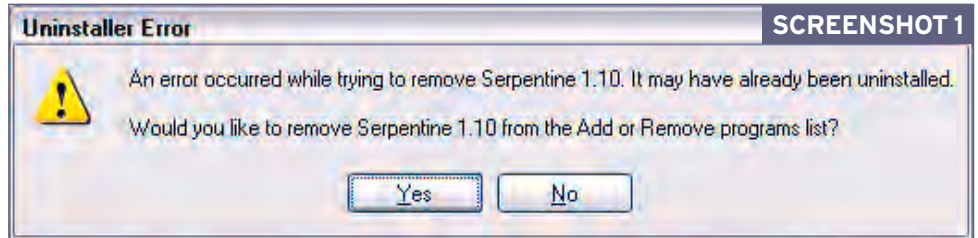
Jim Carless

A Several companies offer USB Gameport adapters that allow you to connect an older joystick or steering wheel to a USB port; Maplin sells one for £12.99 inc VAT (**www.maplin.co.uk**). Be warned, however, that we've heard reports of incompatibilities with various USB-to-Gameport adapters and certain, usually more sophisticated, controllers. In some cases, additional controls or force feedback may not work properly. Consequently, ask the adapter manufacturer or supplier for assurances on compatibility, or a money-back guarantee.

Q The motherboard in my PC recently died and I had to buy a second-hand replacement in order to use the same processor and memory as before. Trouble is, it didn't come with any instructions, and while the processor, memory and cards have gone in no problem, I'm unsure exactly how to connect the various leads for the front-panel lights and switches. Does it matter if I connect, say, the lead from the power button the wrong way round on the motherboard?

John Earle

A Connecting the wires and plugs for the case lights and switches is often the most fiddly job when building a PC or replacing a motherboard. Most motherboards label the pins so you'll know which are for, say, the power button or the hard disk LED, while most plugs from the case are similarly labelled. The problem, as you've pointed out, is little or no indication of which way round they should be connected. Usually there's a coded diagram in the motherboard manual, and on the cables red (or the darkest colour) is usually the positive lead.

SCREENSHOT 1

Uninstaller Error

An error occurred while trying to remove Serpentine 1.10. It may have already been uninstalled.

Would you like to remove Serpentine 1.10 from the Add or Remove programs list?

Yes   No

XP should offer to remove a dead entry from the Add/Remove list if it is unable to install the program

Fortunately, on the systems we've built anyway, connecting these plugs the wrong way won't damage your system. In the case of a power button, you may find connecting it the wrong way will immediately start up your system, or simply do nothing at all. Similarly, if you connect the cable for a front case light the wrong way, it may not illuminate when you expect it to, or at all. In both instances, simply turn off the power to your PC and switch round the plugs for these wires. The next time you switch on the power, everything should be fine.

Q I installed Windows XP Media Center Edition 2005 as described in April's Hands on Hardware column, but recently have found my TV recordings have been stuttering much more than usual.

Dave Roberts

A If you're using Freeview digital tuners, you'll already be used to occasional stuttering anyway, but if you're experiencing more than usual it's most likely due to your system running low on disk space. Since Media Center is used to producing files measuring several gigabytes, it considers less than 10 or so available on your hard disk as running low. We've found that deleting recordings to free up at least 10GB of space on a hard disk should ensure Media Center makes stutter-free recordings.

Windows

Q I have programs listed in Control Panel 'Add/Remove' programs that are no longer installed on my computer. Under Windows 98 I was able to remove these entries with the Microsoft TweakUI Powertoy, but the XP version of TweakUI doesn't have this facility. Is there a Registry hack I can use?

Michael Connor

A There is indeed – delete the relevant keys from

HKEY_LOCAL_MACHINE\ SOFTWARE\Microsoft\Windows\ CurrentVersion\Uninstall, having first made a System Restore point. However, there is an easier way, which is so obvious that many people miss it. Should Windows XP not be able to uninstall the program, because the program or its uninstall files are missing, then it should offer to remove the entry (see screenshot 1).

Q Can you tell me why using Windows XP Explorer to copy a couple of thousand files (about 93MB) to my recently purchased Iomega USB2 mini flash drive took over 30 minutes? If I first compress them all into one large zip file and then copy this over to the Iomega, it is literally done in a flash!

Terry Hart

A You've practically answered your own question there. The time is taken up not with transferring the data, but with setting up the file structure on the flash drive. For 2,000 files this can be a lengthy business – for one zip file it's near-instantaneous.

Databases

Q Is there an easy way of making it possible to only edit forms from the design view, and not from the form view? I am using Access 2000.

Jordan Lee

A Yes there is – one of the form's own properties controls where a form can be edited. With the form open in Form view, click the Properties button on the top menu bar. To view the properties of the whole form, click in the vertical grey bar on the left side of the form. The property sheet will say 'Form' in its header. Click the Other tab and right at the bottom of the list is the Allow Design Changes property. The default is All Views, but clicking the button

to the right lets you select the alternative: Design View Only.

Once you've made this change, you'll only be able to see the form properties sheet, and that remains visible only until you save and close the form. When you open the form again, the property sheet will not appear and the Properties button is greyed out.

Should you wish to return the form's behaviour to being editable, go to Design view and re-set the Allow Design Changes property to All Views.

Spreadsheets

Q Every 12 weeks I have to produce 250 percentage scores after completing an audit in 10 separate locations. I would like to highlight particular scores with colour. If the score is 70 per cent it would be printed in blue. If below 30 per cent it would be in red. I'm using Windows 98 and Lotus 1-2-3.
Rodney Cast

A Using 1-2-3 you would have to write a macro or, if you have Lotus 1-2-3 97 or later, use Lotus Script. If you had Excel you could use the built-in Conditional Formatting feature, which is intended for jobs like this. Excel offers a variety of file format converters for different versions of Lotus 1-2-3 files so your previous work can continue to be used. It even has a special Help section for 1-2-3 users. Not that I'm promoting Excel over 1-2-3 – it just happens to have this one feature which would be useful to you.

Q How do I find the date 10 weeks from today?
Lisa Baggott

A Just enter in a cell, =TODAY()+70. This is because, whatever the cell displays in a cell, a spreadsheet date is stored as a number, counted in days. In Excel for Windows it counts from 1 January 1900. You only have to add 70 (10 x 7 days) to that underlying number. Then format to taste. From the selection offered, or using Custom formatting, you could display a date as 1/8/05 or August 1, 2005 or Monday, Aug., 1 2005 or even 2005-08-01.

Q I want to use Excel to do analysis of racehorse data copied from a web page. When I copy and paste weight data in stones and pounds – for example, 9-5 – I want the data to retain its format as text. Unfortunately Excel won't do

this, although Works will. How can I format the sheet and retain the entry on pasting?
Alan Bridges

A You don't say which version of Excel you are using. But with recent versions, select the data you want to copy in your web browser. On the Edit menu, click Copy. If your browser doesn't have this command, see your browser's Help for information on copying. Switch to Microsoft Excel. Click in the upper-left corner of the worksheet area where you want the copied data to appear. On the Edit menu, click Paste. If the data does not appear as you expect, click the down arrow by the displayed Paste Options button and select one of the following options: Keep Source Formatting, where no changes are made; Match Destination Formatting, which matches the default Excel cell formatting; or Create Refreshable Web Query (see screenshot 2). This gives you the opportunity to create a query to the web page you copied from, and to refresh the data should the web page change later.

Q It seems Excel doesn't understand how to multiply an hourly rate times an amount of time worked. Or is it me?
**Robert Hanwell**

A If you've 2hrs:45mins formatted as Time in cell C6, and an hourly rate of £25.00 in D6, then enter C6*D6*24 in cell E6 to get the right answer, £68.75. Format D6 and E6 as Accounting or Currency (see screenshot 3).

Q Is it possible to set up conditional formatting so that, if a duplicate alphanumeric number is entered into a column, it highlights the entry? This should exclude blank cells.
**Dave Hill**

A Let's say that in the range B2:B20 you have a number of entries such as 12B, 17a and so on. There are also some blank cells. First name this range List. Highlight the range, choose Conditional Formatting on the Format menu. Make Condition 1, Cell Value Is, and then, equal to, and in the third box put, 0 (see screenshot 4). For the format choose white from the Patterns colour palette if your background colour is white. Make Condition 2, Formula Is, =IF(COUNTIF(List,B2)= 1,0,1) and choose gold from the Patterns palette.
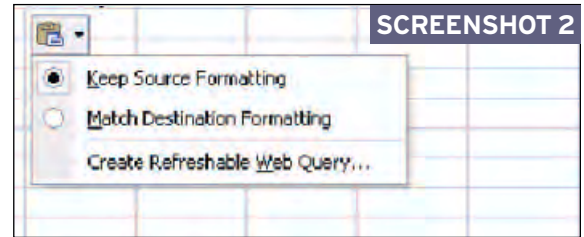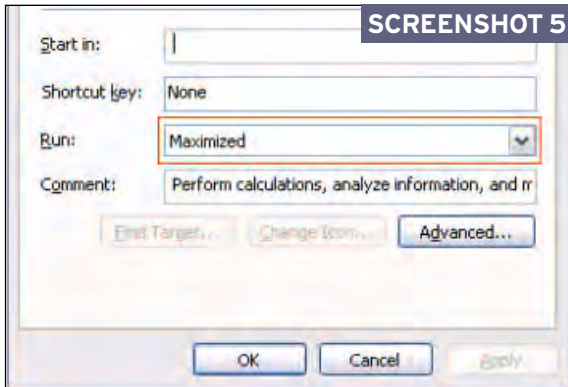

SCREENSHOT 2

You can choose the formatting for data you've taken from the web
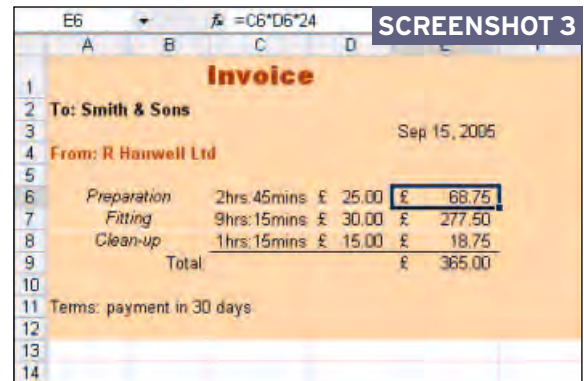
SCREENSHOT 3

Formatting cells as Time, Accounting and Currency gives you the right result for hourly rate multiplied by hours worked
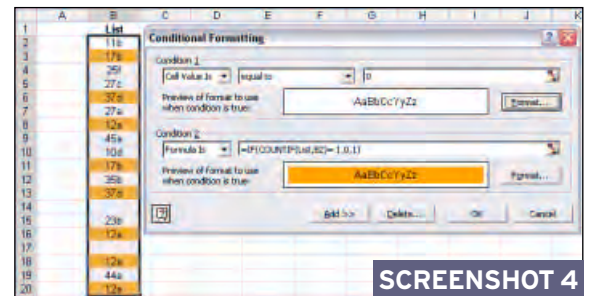
SCREENSHOT 4

Conditional formatting can help identify duplicates

SCREENSHOT 5

Make Excel fill the screen when it launches

SCREENSHOT 6

Safety first: ensure Excel does automatic backups

SCREENSHOT 7

Rounding times to quarter- and half-hours is easy

Although, from Excel's point of view, zero in a cell is different from a blank cell, this works.

Q Sometimes when Excel opens it only fills half my screen. How can I make it always fill all the screen when it starts?

Ron Fuchs

A Generally speaking, Excel opens to the window size at which it was last closed. But you can force it to always open maximised. Go to the shortcut you normally use for opening Excel. Instead of using the left button to open it, right-click the shortcut instead and choose Properties. Click the Shortcut tab and down below, where it says, Run: Normal window. Click the down arrow, choose Maximized and then OK (see screenshot 5). That will do it.

Q Can you tell me where to find the option in Excel to save a backup of a file?

Clem Pavey

A On the File menu choose Save As. On the right-hand side of this dialogue box you'll see a Tools menu. Choose General Options. In this next dialogue box click the 'Always create backup' checkbox and leave everything else (see screenshot 6). Whenever you save this file, it will create a backup copy with an .xlk extension in the same folder as the original file.

Q When I copy data from a worksheet in Excel and paste it to another blank worksheet the formatting disappears and I have to reformat it all. The data is there but the formatting is lost. Can I avoid this somehow?

Dave Murray

A You don't say which version of Excel you have. In recent versions the formatting is transferred along with the data. Column width transference is optional. The only formatting which doesn't transfer is row height. You can also transfer formatting by clicking on the Select All button (the square to the left of the column letters and above the row numbers), choosing the Format Painter tool, then clicking on the Select All button on the second worksheet. In this case, the row heights will also transfer.

Q Is there a way to get Excel to round off times to the nearest quarter-hour?

Hilary Jamieson

A Time is recorded as a fraction of a day in any spreadsheet; for instance, 6pm is recorded as 0.75 because it is three quarters of the way through a day. But the basic underlying number, used for storing dates, is a count of days since 1 January 1900. That makes this sort of calculation easy. As there are 24 hours in a day and four quarter-hours in an hour, there are 96 quarter-hours in a day. So if a time is entered in cell B2 on an Excel worksheet you can enter =ROUND(B2*96,0)/96 in C2 (see screenshot 7). Similarly, if you wanted to round the time to the nearest half-hour, you could enter =ROUND(B2*48,0)/48 in cell C2. You can drag these formulas down their respective columns as far as needed. Format all cells as Time. With the Analysis Toolpak installed, you could use =MROUND(B2,(1/96)) and =MROUND(B2,(1/48)) instead.

Q Wouldn't it be useful if there was a quick way to shift all the visible tabs of an Excel workbook along to the left, block by block?

Bill Hollis

A It would... and there is. A little-known shortcut enables this. To the left of the tabs are four little arrows, commonly referred to as the VCR controls. The far left one takes you to the first lot of tabs. The one to the far right takes you to the last lot. Right-clicking on any of them brings up a shortcut menu listing all the sheet names. You need to hold down Shift and click one of the inner arrows (arrow 3 to go forward or arrow 2 to go back) and the next screenful of tabs will appear.

Q What's the fastest way of selecting and applying a Style on an Excel worksheet?

Ron Doyle

A Press Alt & ' (apostrophe). The style dialogue box will appear and you can make your selection, or modify it, or merge another style with it.
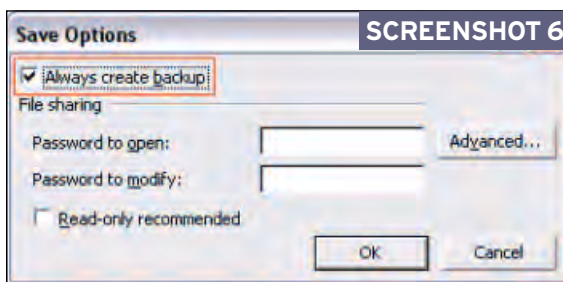
Digital imaging

Q I am a great fan of *PCW* and have been reading it since I was 13. I am 17 now and completing an A-level in graphics and digital art. For my project I recently upgraded to Illustrator CS2. Since making the jump I have had a problem. For some reason the fonts on the display area won't show. I am having to go through the type menu instead.

Is there any way to change this? I have already tried repairing, re-installing and much more but to no avail. Adobe hasn't been a great help either.

Hussain

A The problem is more likely to be with your fonts setup than with Illustrator. Are your fonts in the usual location – that is, in Windows\Fonts? Do you have a lot of fonts installed? If so, try backing them up, removing them all and reinstalling only your 'core' fonts. Apart from anything else, this will make Illustrator much quicker to launch. Are you using any kind of font management utility, such as Adobe Type Manager or Extensis Suitcase? If so, disabling it will soon highlight an incompatibility problem. If this doesn't get you any closer to discovering the cause of the problem, try copying some fonts into the Illustrator fonts folder and see if these display.

Q I was interested to see a reference by Gordon Laing in the June 2005 issue of *PCW* (Hands on Hardware) to a tool allowing simple cropping of DVR-MS files.
 Do you know of a similar tool for editing the vob files produced by my Liteon 5005 PVR?

A There are several. Try Virtualdub (**www.virtualdub.org**) with fccHandler's mpeg2 upgrade (**http://fcchandler.home.comcast. net/stable/index.html**), Womble Multimedia's MPEG2VCR, or Vobedit (**www.videohelp.com/tools?tool=132**).

Word processing

Q As a technical author I use both Microsoft Word and Framemaker at work. I am looking for a word processor or possibly a DTP package to use at home. I know there are many cheap and open-source packages out there – I have tried most of them. The best bet is Open Office Writer but, and it is a big but, from my point of view none of them have the built-in simplicity of Framemaker's keyboard access to paragraph styles or Word's customisable keyboard shortcuts. Do you know of any free/cheap and good apps that might be worth considering? Or even how to do non-mouse or less-than-six-keypress style assignments in Writer?

Rob Irvine

A Ability Office is cheap and lets you assign keystrokes to styles (see screenshot 8). You can do this in

Open Office or Star Office Writer with the help of a macro. First, switch on macro recorder (Tools, Macros, Record) then change the style to Heading 1, for example. Stop recording and save the macro as Head1. Now go to Tools, Macros, Macro. Highlight the new Head1 macro and click 'Assign'. This will open the Configuration dialogue, with the Keyboard tab active and your module and macro highlighted in the Category and Function panes at the bottom. Now select a key combination, for example, Ctrl & Shift & H, from the list at the top and click Modify – this will re-assign that combination to your macro (see screenshot 9). OK out of the Configuration dialogue and close the macro dialogue. Back in the document, press Ctrl & Shift & H and that, in its own good time, will change the current style to Heading 1.

Q I am upgrading from Office 97 to Office 2003 (under Windows 2000 and XP) and want to be sure I don't lose settings patiently accumulated over several years. Under Word 97, my macros, styles and custom toolbars are in normal.dot. My Autocorrect entries are in a .acl file. For Excel 97, macros are in personal.xls and toolbars in an xlb file. All macros are in VBA. Will I be able to just copy these configuration files over the default ones installed after setup; that is, will they be compatible? Or is it even possible that the installation will recognise the former version and assume the former settings?

Russell Greene

A I have upgraded from every version of Word since the original Word for Windows through to Word 2003 without a problem, simply by installing the newer version over the existing one – all my macros, styles and so on were preserved. There can be difficulties with converting Word Basic macros to VBA, but that won't affect you. However, I would certainly back up all templates as well as the files you mention. You should also back up your custom dictionaries and, if you have any, exclusion dictionaries. You might also want to create the settings restore macro described in July's column – make sure you tab through the File Locations and Spelling pages, then when you run the macro on the new version Word will know where to look for templates, custom dictionaries and so on.

SCREENSHOT 8
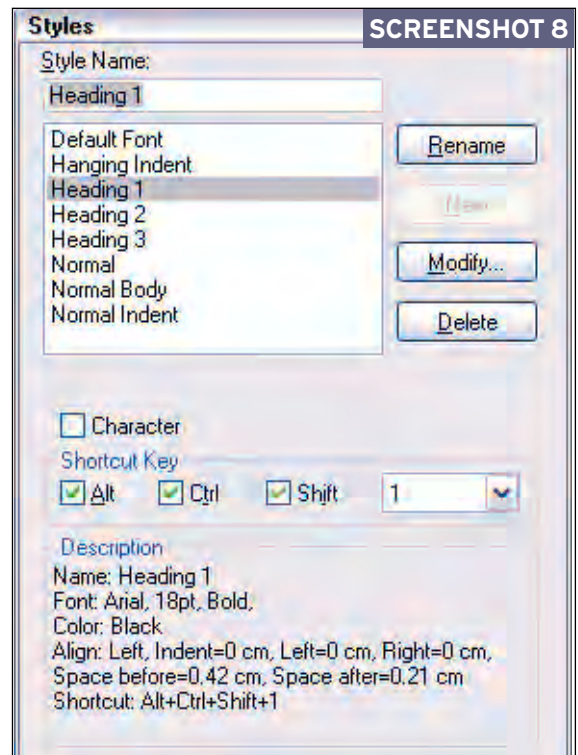
Ability Write lets you assign keyboard shortcuts to styles...

SCREENSHOT 9
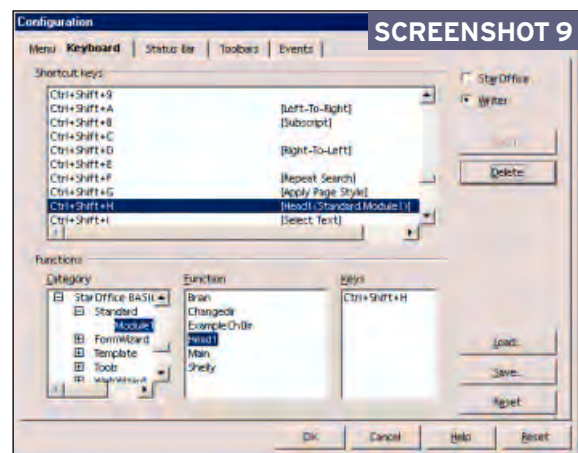
...but Star Office requires an intermediary macro

CONTACTS

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Hardware:	hardware@pcw.co.uk
Linux/Unix:	linux@pcw.co.uk
Networks:	networks@pcw.co.uk
Overclocking:	overclock@pcw.co.uk
Sound:	sound@pcw.co.uk
Spreadsheets:	spreadsheets@pcw.co.uk
Visual programming:	visual@pcw.co.uk
Web development:	webdev@pcw.co.uk
Windows:	win@pcw.co.uk
Word processing:	wp@pcw.co.uk

Please do not send unsolicited file attachments.

Gordon Laing
has been a hardware enthusiast ever since his first Sinclair ZX80 and, as a former editor of *PCW* and contributor for over 10 years, what he doesn't know about technology isn't worth knowing

Watts the difference

Here are some tips on which motherboard to use to build a PC that doesn't eat up power

Power consumption is an important but rarely mentioned specification of a PC. Most of us are too concerned with performance, storage capacity and expansion capabilities to worry about how much it will cost to run the machine.

Yet of all the devices in a home or office, the PC is one of the greatest consumers of power, especially when you consider it could be on for the best part of every day. Multiply this over the lifespan of a machine, or across multiple systems in a business, and the difference of a few watts could make quite a saving in terms of the environment and utility bills.

While some advances are being made in power saving on traditional desktop platforms, significant savings need alternative technologies. Over the past two editions of Hands on Hardware, I've been testing the first desktop motherboards to use Intel's Pentium M processor. Originally designed to extend battery life on mobile devices, the Pentium M can equally be used to save power on a desktop, while delivering excellent performance.

In earlier editions I've also tested Via's Epia platform, which employs Via's own processors integrated on highly compact motherboards. Designed primarily for non-mobile environments (although they can be used in cars and boats), the Epia is one of the most frugal PC platforms around. The small form factor also allows it to be implemented in some innovative configurations.

If you're building your own economical-to-run PC, which platform works out the best? I decided to find out using the latest models representing each platform: Via's Epia SP13000 versus the Pentium M in Aopen's i915GMm-HFS motherboard.

Test setup
Both platforms were tested with the same components: a Silentmaxx 423w fanless power supply (from www.quietpc.com), Seagate 400GB Serial ATA (Sata) hard disk loaded with Windows XP Media Center Edition 2005 and Kingston Hyper-X DDR memory.

The Aopen board required a pair of Dimms, whereas the Epia could only accommodate one. Consequently the Aopen was tested with 1GB
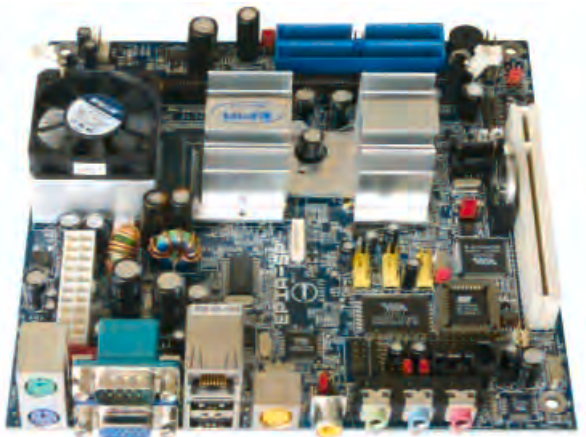
Top: If you're after a high-performing platform with low power consumption, Intel's Pentium M is one of the best choices. Several motherboards including the Aopen i915GMm-HFS pictured, allow you to build desktop systems using Intel's Pentium M

Bottom: For size and low power consumption, Via's Epia platform is hard to beat. The Epia SP13000 pictured is the fastest model at the time of writing

compared to 512MB on the Epia, although this didn't impact the particular tests used. Both motherboards were tested using their onboard graphics.

Size and connectivity
Both boards are square but very different in size. The Aopen board measures 24 x 24cm compared to 17 x 17cm for the SP13000. An extra 7cm in each direction may not sound like much but, side by side, the Epia is considerably smaller, which allows it to be fitted into much smaller cases.

The difference in surface area greatly affects each board's expansion options. The Epia board manages to squeeze on a single PCI slot and has room for only one memory Dimm, whereas the Aopen board boasts two traditional PCI slots, two PCI Express slots (one x16 and the other x1) and support for a pair of either DDR or DDR2 Dimms. While it's possible to fit a PCI riser card to most Epias in order to support a pair of PCI cards, the Aopen board has much greater expansion options.

In terms of connectivity, both boards are well equipped with the usual ports, although each has

additional capabilities worth mentioning. The Aopen board in particular has a wide array of connectivity for its onboard graphics. There's analogue VGA, digital DVI and S-video, along with three RCA jacks for a component video connection that supports high-definition displays. Two of its six 3.5mm audio jacks double up as optical digital input and output ports. The SP13000 also has an S-video TV output, a single RCA jack that can be switched between digital audio and composite video, along with Firewire capabilities.

Assessing performance
Like all Via Epia boards, the SP13000 has an integrated processor that cannot be upgraded – in this case, a 1.3GHz C3 processor. The Aopen i915GMm-HFS employs a Socket-479 that can take a Pentium M processor running on either a 400 or 533MHz front-side bus (FSB); I tested it with a Pentium M 770, clocked at 2.13GHz.

In *PCW*'s standard benchmarks, the Via Epia boards are easily beaten by other platforms. Running Sysmark 2004, the SP13000 and Pentium M 770 systems scored 41 and 180 respectively. When it came to encoding a 10-minute DVD vob file into DivX using Dr DivX and its High Quality profile, the Pentium M 770 took just under 20 minutes, compared to just over 90 minutes on the SP13000.

It's no surprise a 2.13GHz Pentium M will vastly out perform a 1.3GHz C3 in raw processing muscle, but it's important to consider the bigger picture and how the system will be used. For example, the Epia SP13000 has hardware mpeg2 and mpeg4 (playback) acceleration, allowing it to play DVDs and other video files perfectly smoothly – and while it may feel slightly sluggish in everyday applications compared to top-spec systems, it remains usable.

Where the Epia falls down is in tasks that require processing muscle, such as fast video encoding and smooth playback of high-definition video files. If these are important to you, then go for a quicker platform.

As a brief aside, it's interesting to compare the performance of the Pentium M against the Pentium 4, especially as the latter boasts a much longer pipeline and Hyperthreading capabilities, both of which should greatly aid video encoding and
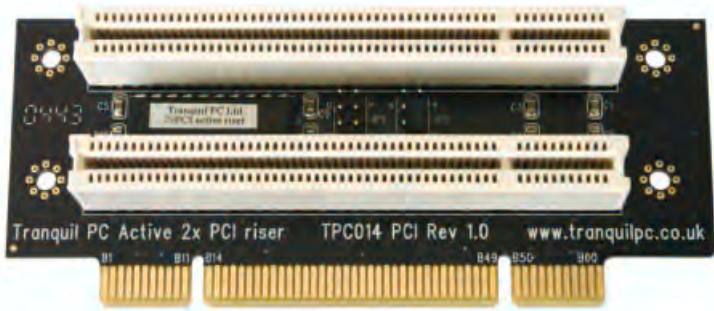
multitasking. Taking a 3GHz Pentium 4 with the same memory and hard disk, the DivX encode took just over 16 minutes, and Sysmark delivered a score of 186. This Sysmark score, despite heavy multitasking, is virtually the same as the Pentium M 770, and the encode was only 17 per cent faster with the Pentium 4. Scores like these prove how quick the Pentium M can be, especially considering its slower clock speeds – remember the Pentium M 770 in these tests was running at 2.13GHz. Future dual-core versions are likely to be very impressive.

Returning to the two platforms under test, their integrated graphics proved modest. The 915 chipset of the Aopen board managed just 214 in 3Dmark05 and 5.6fps (frames per second) in Doom 3; that said, the Via Unichrome Pro AGP graphics on the SP13000 refused to even run Doom 3 or 3Dmark03 and 05. However, the Aopen board could take a PCI Express graphics card and, equipped with an Nvidia 6600GT, the system scored a respectable 3,411 in 3Dmark05 and 73.4fps in Doom 3.

Power consumption
The reason for this month's tests was power consumption. I connected the Silentmaxx power supply to the mains through a Maplin power meter costing £24.99 from **www.maplin.com**. Like all PC power supplies, there's a small amount of electricity consumed even when the PC itself is switched off, to power standby functions such as wake-on-Lan or timed power-on. In the case of the Silentmaxx 430w you're looking at a wastage of 10w, which is fairly typical, but it can be reduced to 2w or less by switching off the power supply.

Using the basic configurations described, the SP13000 and Aopen i915 systems consumed 42 and 56w respectively when idle but running Windows, with both increasing to 55w and 69w respectively when under heavy processing load, such as encoding video.

These are both impressive scores when compared with traditional desktop platforms. The 3GHz Pentium 4 system mentioned earlier consumed 94w when idle in
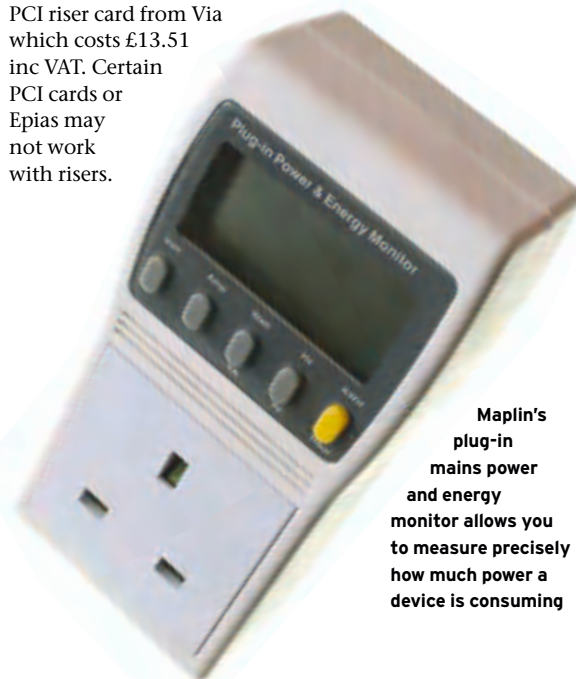
Windows, leaping to 148w when encoding video, while an Athlon 64 4000+ system with the same disk and memory consumed 80w when idle, jumping to 125w when encoding. To be fair, both the P4 and Athlon systems tested also featured graphics cards but, unless you're playing 3D games at the time, they usually add no more than 10-15w to the total system power consumption.

While the use of onboard graphics helps reduce power consumption, it's clear the architecture of the Via Epia and Pentium M platforms allows them to be economical systems to run. The Epia is most impressive in this respect.

Support for MCE
Before moving on to a final conclusion, it's worth mentioning compatibility with Windows XP Media Center Edition 2005, as many people will use these platforms as entertainment systems.

I fitted a pair of Avermedia A16A DVB-T digital tuner cards to each configuration, using a riser card for the Epia. The A16A cards cost £89.98 inc VAT each from Media Atlantic at **www.mediaatlantic.com**, and you can download MCE-specific drivers from that site too. Riser cards are available from the Mini-ITX store at **www.mini-itx.com/store** – I used the dual PCI riser card from Via which costs £13.51 inc VAT. Certain PCI cards or Epias may not work with risers.

Via's Epia motherboards may only feature one PCI slot, but two cards can be fitted on most models with the aid of a PCI riser card costing less than £15. Note that certain cards or combinations may not work with riser cards or some Epias

Maplin's plug-in mains power and energy monitor allows you to measure precisely how much power a device is consuming

With Cyberlink PowerDVD 6 installed as an mpeg2 decoder, both systems worked fine with Media Center Edition 2005. I tried recording two shows simultaneously while playing a third or a DVD movie, and it all ran smoothly on both platforms. Both systems could also suspend into S3/Suspend-to-Ram mode and wake up to record, or from a command from the USB remote control. To successfully implement this, you'll need to enable S3 and USB wake-ups in the Bios before installing Windows, then apply the Registry hack after installation (as detailed in April's Hands on Hardware).

The Aopen motherboard came with a fan that was quieter than the SP13000 and could also be configured to power down into silence when not required. Finally, in terms of power, the two cards increased the idle consumption of the SP13000 and Aopen systems to 58w and 69w respectively, with each gaining an additional 3w or 4w when both cards were recording.

Price and conclusion
The Via SP13000 has the edge on size and power consumption, but the Aopen i915 with a Pentium M is considerably more powerful, quieter and offers greater connectivity, especially for media systems.

The biggest difference though is price: the SP13000 with built-in processor costs £163.32 inc VAT (**www.mini-itx.com/store**), whereas the Aopen i915GMm-HFS costs £149.22 inc VAT (**www.dabs.com**), on top of which you'll need to add a Pentium M, costing from £137 inc VAT for the 1.6GHz 730 model to a whopping £450 inc VAT for the 2.13GHz 770 model (**www.ebuyer.co.uk**). So you're looking at a premium of at least £125 for a Pentium M system over the SP13000, and considerably more if you want one of the faster models.

What both platforms have proven is the possibility of building a PC that runs on half the power of a conventional desktop, and in the case of the Pentium M with little or no compromise in performance. If you're interested in low-power platforms and would like to read more about them in future Hardware columns, please let me know at the address below.

CONTACTS
Gordon Laing welcomes your comments on the Hardware column. Email him at: **hardware@pcw.co.uk**. Please do not send unsolicited file attachments.

Gordon Laing
has been a hardware enthusiast ever since his first Sinclair ZX80 and, as a former editor of *PCW* and contributor for over 10 years, what he doesn't know about technology isn't worth knowing

How fast can an Athlon 64 go?

Find out how far we pushed AMD's processor in our overclocking tests

The most common question asked of this column is whether it's possible to overclock a specific processor. The simple answer is very probably. I've tried overclocking every system I've built since the early 1990s and managed to squeeze additional performance out of virtually every one.

Of course, there are always caveats. Some configurations overclock more easily or further than others. The best I've seen can stretch to clock speeds 33 per cent faster than normal without the need for increases in the core voltage or exotic cooling systems. Conversely I've tested others which struggle to deliver much more than five per cent extra speed and may demand additional voltage and cooling upgrades to remain stable.

There's never any guarantee with overclocking and it's also crucial to understand that you'll invalidate your warranty and could damage your components or reduce their lifespan – you'll also be proceeding entirely at your own risk as *PCW* cannot offer any support should things go wrong. That said, if you're willing to take a risk, you could enjoy some additional performance for free and find out exactly what your processor is capable of doing.

Which brings us back to the original question and Adam Heath who this month wrote in to ask whether it was possible to overclock his Athlon 64 processor. The answer is yes, but before delving into some results, here's a brief backgrounder.

At the time of writing, the Athlon 64 came in two versions for Socket 939 systems: the standard Athlon 64 and the high-end Athlon 64 FX; however, the dual-core Athlon 64 X2 will be out by the time you read this. The models in the Athlon 64 FX range have a larger Level 2 cache, run faster and are much more expensive than the plain Athlon 64s. They also offer a unique advantage to enthusiasts: an unlocked clock multiplier.

Traditionally, most processors have their internal clock multiplier locked. This number is multiplied against the front-side bus (FSB) speed to derive the processor's operating frequency. For example, a 3GHz Pentium 4 designed to run on a

Shuttle's SN25P barebones system is designed for Socket 939 Athlon 64 and Athlon 64 FX processors. Even when overclocked, the system fans run very quietly

200Mz FSB has a fixed 15-times clock multiplier. If this multiplier could be increased to, say, 16-times, the processor could be driven at 16 x 200MHz or 3.2GHz. Since the clock multiplier is locked, though, the only way to overclock this and most other processors is to increase the FSB speed, which in turn will impact on other components.

In contrast, the Athlon FX processor allows you to increase its clock multiplier. Again there's no guarantee doing so will work, but the option is there for overclockers. Interestingly AMD recently took its Athlon FX-53, locked its multiplier from any increases and rebranded it as the Athlon 64 4000+. This is the processor I used for the first half of this month's overclocking tests. It's clocked at 2.4GHz with a 200MHz FSB.

Test system

To test the Athlon 64 4000+ I used a Shuttle SN25P barebones system fitted with 1GB of Kingston Hyper-X memory, an Nvidia 6200 PCI Express graphics card and a Seagate 400GB Serial ATA (Sata) hard disk running Windows XP Professional.

In Sysmark 2004 this configuration scored 198, compared to 186 for a 3GHz Pentium 4. I then timed how long it would take for Dr DivX to encode a 10-minute vob file using the High Quality Home Theater profile. The Athlon 64 4000+ took 15 minutes, 25 seconds compared to 16 minutes, 12 seconds on the 3GHz P4.

AMD may allow the clock multiplier to be reduced on all its Athlon 64 processors for power-saving

applications, but since my 4000+ was locked from any increases, the only way I could overclock it was to increase the FSB speed. I increased the bus from 200MHz to 210MHz in the Shuttle Bios and the system restarted smoothly without the need for additional voltage, clocking the processor at 2.52GHz. This time Sysmark 2004 scored 203 and the DivX encode took 14 minutes, 52 seconds.

Feeling optimistic I entered the Shuttle Bios again and tried a bus speed of 220MHz. Sadly, Windows refused to load even with a boost in voltage. Annoyingly it wouldn't play ball at a bus of 215MHz either, nor indeed anything beyond 210MHz. By pure chance I'd reached the overclockable limit on my first attempt as far as my particular configuration was concerned.

I'll certainly be trying more Athlon 64 overclocks in the future, but in the meantime, the technique of making small increases of the FSB should do the trick on most systems.

Pentium M overclocked

Before wrapping up, here are some brief results from overclocking with the Aopen i915GMm-HFS motherboard used for the Pentium M tests in the Hardware column.

Fitted with the 2GHz model 755 on a 400MHz bus, the system scored 166 in Sysmark 2004 and took 20 minutes, 31 seconds in the DivX encode. The fastest overclock I managed was with the bus increased to 440MHz and the processor clocked at 2.2GHz. This scored 183 in Sysmark and performed the encode in 18 minutes, 22 seconds.

Switching to the 2.13GHz model 770 on a 533MHz bus, the system scored 180 in Sysmark and 19 minutes, four seconds for the encode. The furthest I could push this processor was to 2.4GHz using a 600MHz bus, with which it scored an impressive 198 in Sysmark and 16 minutes, 42 seconds for the encode – coincidentally very close to the Athlon 64 4000+ in clock frequency, performance and price.

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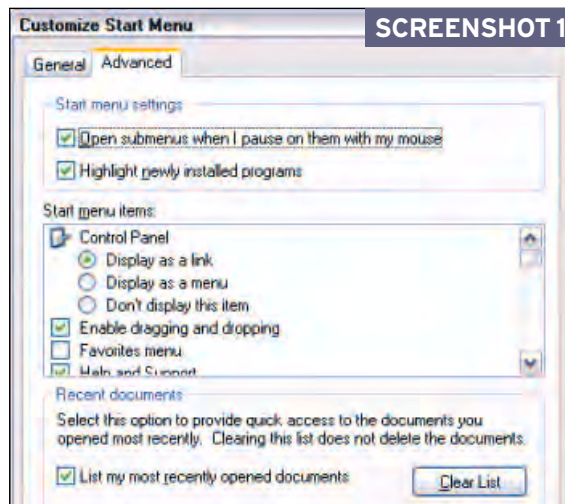
Customise your recent documents list

You decide how many files you want to see – if any; and an image thumbnail problem solved

The idea of keeping a list of recently opened files has been with us since Windows 95 (although this was also a feature of some applications under Windows 3.1). Initially, the idea was beautifully simple. Windows maintained a folder, either Windows\Recent or under a User Profile, containing shortcuts to the last 15 data files opened. A list of these appeared as a 'Documents' sub-menu from the Start Button, and you could clear the list from Start Menu Properties. TweakUI upped the options with the facility to clear the list on shutdown or disable it altogether.

Windows ME complicated things by keeping the Start Menu list down to 15 items but removing the limit on the corresponding folders. We haven't been able to fathom the wisdom of this, but it does mean you can have a longer recent list by opening the corresponding folder. If you want to be really clever then create a toolbar on the Taskbar – right-click on the latter, Toolbars, New Toolbar… then browse to the relevant Recent Folder. In XP this will be at Documents and Settings \<username> \My Recent Documents. Drag the new toolbar handle to the right of the Taskbar so only the title shows, and you will get a pop-up list of all the recently used files and recently accessed folders (which you don't get in the Start menu).

Alternatively, you can create a shortcut to the folder itself – this will let you view the shortcuts in a normal Explorer window and, if you switch to details view, you can sort by type, date and so on. Windows XP users have an added refinement here. In any view except 'List', if you go to View, Sort Icons by… then tick the 'Show in groups' option, you can sort the files under headings such as type, size or date. The last is particularly useful as it produces a list similar to Internet Explorer's History, with the files listed under 'Today', 'Yesterday', 'Last week' and so on.

Obviously, there is a privacy issue here – you may not want others to be able to see the names of files you have been working on. In all versions of Windows you can clear the list. In Windows 98, go to Start Menu Properties, turn to the Start Menu Programs tab and hit the 'Clear' button. In Windows ME and 2000, it's Start Menu Properties, Advanced,

SCREENSHOT 1

You can clear XP's recent documents list so others can't see it, and you can turn the feature off completely

Clear and, in XP, just to keep us on our toes, it's Start Menu Properties, Customize, Advanced, Clear List (see screenshot 1).

Clearing the recent list clears the entire content of the Recent folder, the IE list of typed URLs that appear as a dropdown list in the Address bar, and the dropdown list of items you have typed in the Start, Run, box.

XP users also have an option to enable or disable the Recent list. If you want to disable this feature in other versions of Windows, you'll

SCREENSHOT 2

SCREENSHOT 3

Top: Clearing recent documents on exit in XP TweakUI…

Right: …and in other versions of Windows, gets rid of the list when you shut down

need to get hold of TweakUI, which you'll find at **www.microsoft.com/ ntworkstation/downloads/powertoys /networking/nttweakui.asp**.

Don't be fazed by the 'NT' reference – this version works for all versions of Windows from 95 to 2000. XP has its own version at **www.microsoft.com/ windowsxp/downloads/powertoys/ xppowertoys.mspx**.

Both versions of TweakUI have an option to clear the list when you shut down the computer. In XP you will find this under the Explorer heading – tick the 'Clear document history on exit' box (see screenshots 2 and 3).
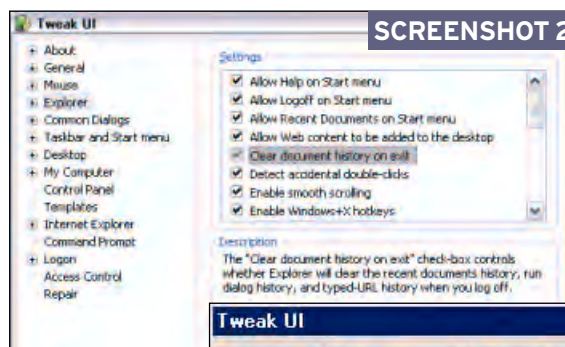
In other versions you'll find the option on the IE tab. As with manual clearing, this will clear the Start Menu list, the My Recent Documents or Recent folder, the Start, Run history and the IE typed URL list.

Windows XP and 2000 users can limit the number of remembered recent files. If, with administrator status, you run the Group Policy Editor (Start, Run, gpedit.msc), then navigate down through User Configuration, Administrative Templates, Windows Components, Windows Explorer, you will see, in the right-hand pane, an option to set the 'Maximum number of recent documents' (see screenshot 4).

There are two things to note here. First, this affects the 'My Recent Documents' folder directly, so what you see on the Start menu will be the maximum less the number of folder shortcuts stored. Second, you need to select the 'Enabled' option button before you can set the number.
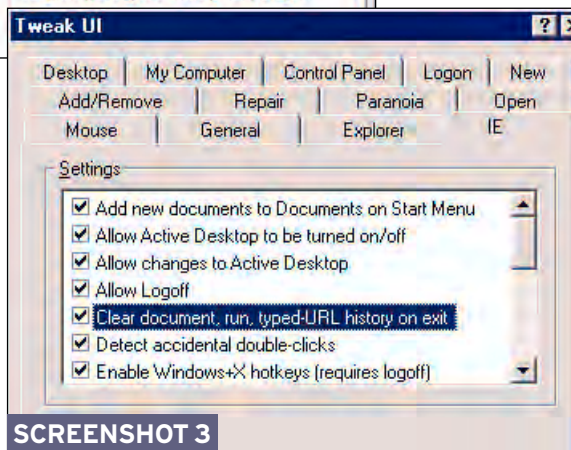
This raises a couple of related problems with applications. One is that, when running Microsoft Office XP under Windows XP, the list of recent documents in the File menu of the applications may be missing, and if you go to Tools, Options, General, the 'Recently used file list' option is greyed out. There's a quick fix for this which needs a little Registry editing, so first
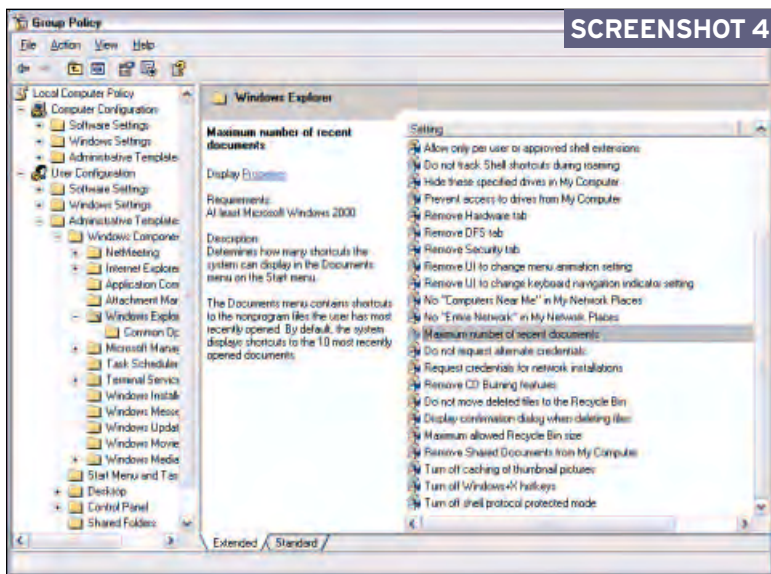
SCREENSHOT 4

You can limit the number of recent items you see in XP

create a Restore Point, then go to HKEY_CURRENT_USER\Software\ Microsoft\Windows\CurrentVersion\ Policies\Explorer. Delete the NoRecentDocsHistory value from the right-hand pane.

In my experience, the application that earns a double-first in annoyance is Apple Quicktime Player. I've found that this 'remembers' files played from removable media. When you remove the media, the links on the Recent menu item are not removed. So the next time you click on a .mov file, Quicktime will open to play the chosen file, then immediately start a fusillade of error messages. When you've clicked all these out of the way, the chosen file will play. The trick is to go to the File menu, Open Recent, Clear menu, which will cure the problem. Unless I am missing something, however, there seems to be no way to disable the Recent feature. Finally, some Windows applets, such as Wordpad, keep their own recently used lists – these are stored in the Registry, independently of the general recent documents.
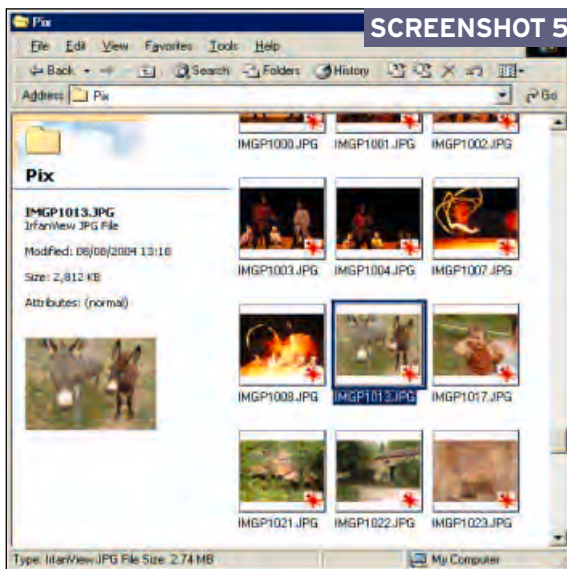
Sore thumbs
The thumbnail view in Windows ME was something of an improvement on Windows 98. For a start, you didn't have to turn it on from the folder properties. However, it can still cause problems, as reader Peter Lowenstein found. Peter noticed that his hard disk had been 'accumulating more bytes than can be accounted for by the total number and size of image files left on it'. Furthermore, he noticed in 'My Pictures' folders containing more than a few hundred images that the display of thumbnails became very slow with some thumbnails that did not correspond with the associated image. This

situation seemed to get worse the longer the folder had been in use.

Suspecting that the missing space might be taken up by hidden files, he went to folder options and turned on 'Show hidden files'. This revealed the culprit was a number of Thumbs.db files, in which Windows stores the thumbnail images so it doesn't have to process every image file each time the folder is opened in thumbnail view. Over time, this file can become very large – Peter found that in some cases the size of the Thumbs.db file exceeded that of the total image files. When an image is deleted or moved from a folder, the Thumbs.db file doesn't always stay synchronised. The file can also become corrupt, with scrambled or missing thumbnails.

The remedy, as Peter discovered, is to delete the Thumbs.db file. Windows will build a new, clean and smaller file. Peter took a tough line, doing a search for Thumbs.db files and deleting the lot. This won back 400MB of disk

Divide and rule – don't have too many pictures in one folder

SCREENSHOT 5

space and, after defragmenting the drive, the display was as fast as ever.

Another important point is the 'few hundred images' that Peter mentioned. Divide and rule should be your motto here – even with a perfect thumbnail cache file, it's still going to take time to stick up all those thumbnails, and you may notice problems such as thumbnails disappearing (being replaced by a generic icon) when you scroll the window, then reappearing in a leisurely manner. It's far better to have more folders with fewer files in each (see screenshot 5).

You can disable thumbnail caching entirely, although this will slow down the display of thumbnails when you do want them. In Windows XP, this can be done via a checkbox in Folder Options, View. In Windows ME and earlier, you need to edit the Registry. Having taken the usual System Restore or backup precautions, go to HKEY_CURRENT_USER \Software \Microsoft \Windows \CurrentVersion \Explorer \Advanced. If there is a value named DisableThumbnailCache, double-click on it to change its value to 1. If there isn't, create a new DWORD value with that name first.

Acrobatics
Further to my comments about being unable to install Acrobat Reader version 6 under Windows 98 (*PCW* June), several readers have mailed to say that they have it up and running under Windows 98SE, so it seems the restriction only applies to the original version of Windows 98.

Gotcha get-out
My comments on the monitor gotcha in July's column, where I was stuck with settings too high for a changed monitor but couldn't change these in safe mode, provoked a quick reaction from reader Paul Richardson. He pointed out that if you hold down the F8 key when booting Windows XP, you will get a longer boot menu that includes an option to enable VGA mode. This will result in the usual eye-watering low resolution, low refresh that you get in safe mode, but with the important difference that the drivers for your display card are recognised, so you can then adjust back to more suitable settings.

Barry Shilliday
has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time prefers to travel the world – and snap it with his camera

Desktop discourse

Improve communication between KDE applications; and more about OpenSSH

There are certain general requirements of a modern operating system. One of these is the ability for different programs, or processes, to talk to each other, since there could be hundreds or even thousands of different ones running concurrently. This is known as Interprocess Communication (IPC) and exists on all forms of Unix and Linux. It operates at a low level and is fundamental to the design of the operating system.

For desktops, something higher level needs to be used, which makes it easy for desktop applications to send and receive more complex messages and act on them accordingly. Different desktops use different mechanisms. Under KDE this is called DCOP, which stands for 'Desktop Communication Protocol'. Despite its quite general name, DCOP does in fact work only with the KDE desktop.

If you have used KDE you'll know it's a well-integrated desktop. Applications are consistent in their design, menus and so on. Communication between the applications might not appear to be too evident, but behind the scenes it is happening all the time. When a KDE session begins, a DCOP server is started, and all applications register with the server. Applications (or clients) can then send or receive messages to and from any other application via the server. These messages are based around the internal functions of the applications, and can therefore be as simple or complicated as the programmers desire. You could, for example, send a message to Konqueror (the file and web browser) to ask it to open up a new window and go directly to a particular website.

This is fine for developers, but as a desktop user you may be wondering how any of this is relevant, or even accessible, to you. You don't have to write your own KDE application to communicate with another, you can use one of two useful programs supplied by KDE: DCOP and KDCOP. These utilities are basic front ends to the DCOP server and allow you to send messages directly to any running KDE applications.
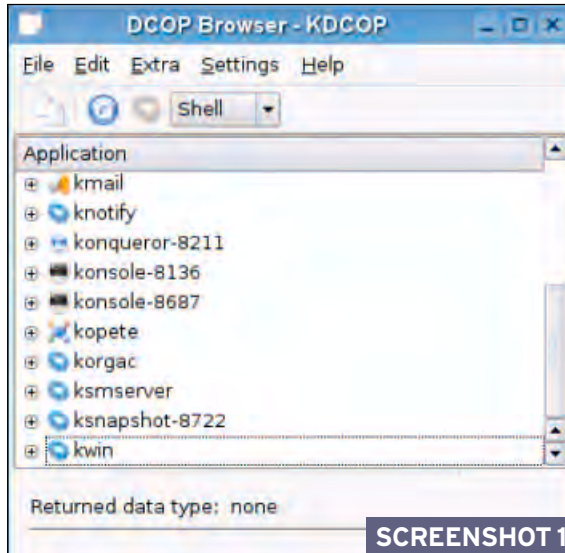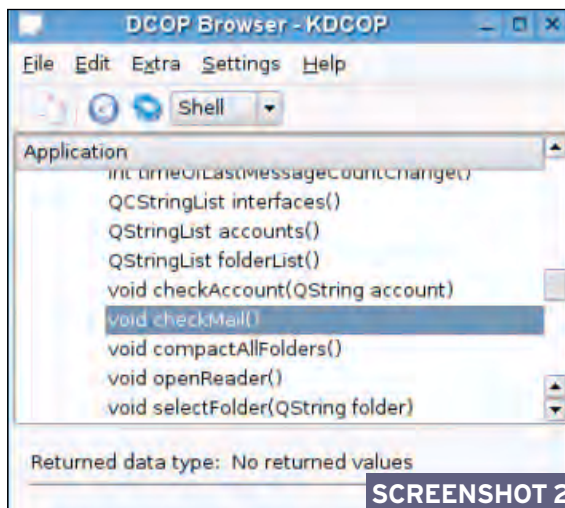

SCREENSHOT 1

The graphical DCOP browser shows you all possible function calls

Call a simple function using DCOP

The clients

KDCOP is a graphical interface to the DCOP server. You probably won't find it on any menu, so hit Alt & F2 to bring up the 'Run Command' window, and enter KDCOP. The browser window pops up (see screenshot 1) and presents a list of running KDE applications. As you can see in the screenshot example, some names have a number after them, while others do not. This is because certain KDE applications can have multiple running instances that are independent of each other. You would probably not want to send the same message to open a particular URL to all instances of Konqueror, for example, so each one has its own unique process ID
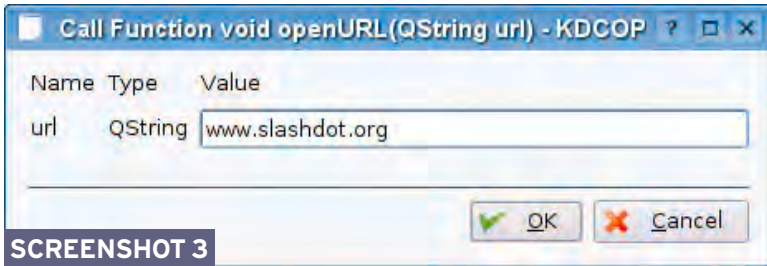

SCREENSHOT 2

attached to the end to distinguish it from the others.

The applications are listed in a tree view, with the various interfaces available shown when you expand the trees. Most of the interfaces aren't of interest, but the 'default' and 'main window' trees are where you will usually find most of the useful stuff. As a simple example, we will ask Kmail to check for new email. The first step is easy enough: find 'kmail' on the list of applications and expand the tree. As above, there are several more trees to choose from now, but since checking email is a general action and not specific to a particular window, you'll find the DCOP interface under 'KMailIface (default)'.

When you expand this tree you will see a long list of what appears to be C++ functions (see screenshot 2) or, to people who don't know any programming, probably meaningless rubbish. Fortunately you don't need any programming experience to do what you want, as the names are straightforward enough – in this instance we want 'checkMail()'. Move your Kmail window to somewhere you can clearly see it and double-click the checkMail() entry. Sure enough, the DCOP message is sent, and Kmail goes ahead and checks for new mail.

Next, for something a bit more complicated, we'll get Konqueror to open a new URL. First make sure a single Konqueror window is open and then check the DCOP browser. Once again, Konqueror's tree has a number of different options. We now want a specific Konqueror window to go to a new URL, so this time 'KonquerorIface (default)' isn't what we need. Instead, find 'konqueror-mainwindow#1' and expand the tree. There is a very long list of DCOP calls now. Find the 'openURL(QString url)' entry and double-click it. Unlike before, a window pops up for you to enter something (see screenshot 3). This is because of the 'QString url' part of the name. If you've programmed before, you'll know this means that openURL requires more information – in this case, some text for the URL to open. Enter any URL you like and watch the Konqueror window go right ahead and load the page.

SCREENSHOT 3

Some DCOP functions need extra information to work

Some DCOP calls need more than one argument, such as setSize(QSize size). The width and height are needed for this call, so the pop-up window asks for two entries. Other calls need no arguments at all and return only information; size(), for example, returns the current size of the Konqueror window, and fullScreen() tells you whether the window has been made full-screen. Browse some of the calls and try a few; the names of the calls are usually sufficient to explain what they do.

Some fairly advanced things can be done using these calls too. Using Kmail's DCOP interface again, expand the tree to KMailIface and double-click the first openComposer entry. A pop-up window now appears to ask for several different fields, such as 'to', 'cc' and 'body'. Enter the 'to', 'subject' and a couple of words into 'body', and a new 'compose email' window starts up with the information completed for you (see screenshots 4 and 5).

This is all well and good, but not entirely useful in practice. The KDCOP program isn't designed for sending messages but rather to browse the DCOP interfaces and to test the function calls. For more general use KDE provides the DCOP client.

Command-line tool
The KDCOP program, while good for browsing, isn't much use for sending messages generally. KDCOP is, more or less, a graphical interface to the DCOP command-line tool. With this latter command you can still browse and send messages, but a benefit of a command-line interface over a graphical one means you can integrate it into scripts or use it with any application that allows you to run other commands.

Open up a shell and run the DCOP command by itself. This gives a similar result to KDCOP, in that it lists the current KDE applications running:
```
$ dcop
kwin
kicker
```
The command accepts wildcards, so you could execute 'dcop konsole*'

to limit the list just to the running Konsole applications. If you run DCOP followed by one of the listed application names, you'll get a similar list to expanding the tree on the GUI:
```
$ dcop kwin
qt
KWinInterface (default)
```
As you've probably guessed, running 'dcop kwin KWinInterface' will then produce a list of all of the DCOP calls available together with any arguments they take. Once you have selected a function call, add any extra arguments needed (such as the URL to open in the previous example) and press Enter. The first example from KDCOP above would be as follows from the command line:
```
$ dcop kmail KMailIface ✔
checkMail
```
(Key: ✔ code string continues)

If you don't have Kmail running, DCOP returns the error 'call failed'. Otherwise you'll see

SCREENSHOT 4

SCREENSHOT 5

Top and bottom: Kmail can help automatically populate email fields

that Kmail does indeed immediately check for new email.

For a more complicated call, such as opening a 'compose new email' window, give the arguments one after the other, each separated by a space. To use spaces in an argument itself you need to put quotes around it. Similarly, to leave an argument blank, use empty quotes. For these reasons, it's probably easier to enclose every argument in quotes. The openComposer function takes arguments for 'to', 'cc', 'bcc', 'subject', 'body', a reserved value and a message file. See figure 1 for an example command.

Using the DCOP client means anybody can take advantage of the communication system in KDE. You could write your own scripts that regularly perform certain actions, or create a desktop or panel icon that performs one or more functions when clicked. One good example is to set up useful actions for certain keys on the keyboard, which we'll look at in detail in the coming months.

More OpenSSH
In last month's Hands on, we saw how to use the common features of OpenSSH: how to log in securely from one system to another (in that case, from a Linux PC to an OSX Mac), and how to use digital keys to enable remote logins without a password to any system. We will finish things off by looking at a few more features of OpenSSH.

If you remember from last month, OpenSSH not only guarantees that the data sent between the systems is encrypted, but it also gives you a very reliable way of knowing you are definitely connecting to the system you want to connect to. Without OpenSSH's security checks, it would be simple for one system to masquerade as another.

When the OpenSSH server is started for the first time it generates some host keys. These are essentially the same kind of keys as those that allow you to log in to another system without a password. The host keys provide a unique identification for any particular system; the private key remains on the server, while the public key is sent out when you first connect. When you then try to connect again, the key you have is verified against the system's private key. If the keys don't match, it could be as a result of a serious security breach.

We can see this in action if we continue last month's example. The Linux PC successfully connected
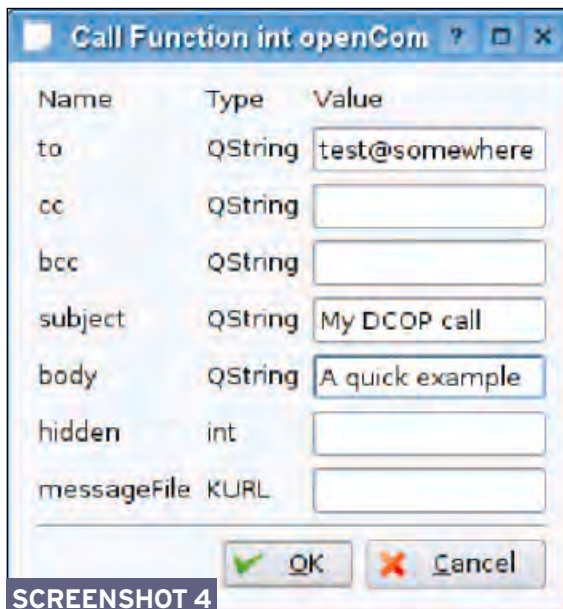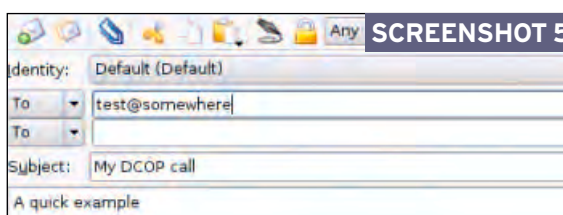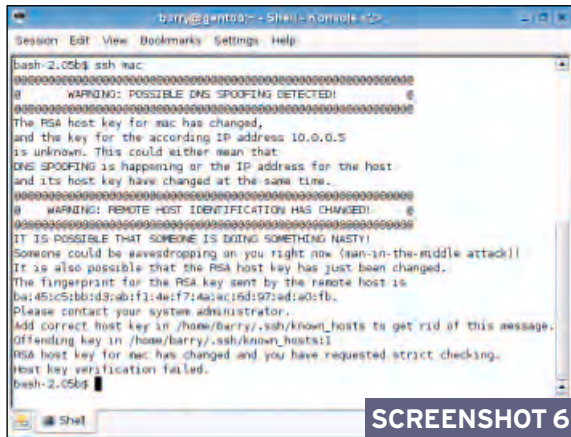
SCREENSHOT 6

to the Mac, and therefore the public host key was exchanged. Since that time, the Mac's operating system has been completely reinstalled, and as the Mac's host keys weren't saved, new ones are in place. This means that, in effect, the Mac is no longer the same computer as it was before. When the OpenSSH client tries to log in to the Mac, the public key is checked and fails the verification. See screenshot 6 for the result.

Rather than cleanly logging in as before, SSH now throws out very obvious warnings and refuses to let you go any further. In this example, not only has the host's identification key changed, but its network IP address has altered too. This could mean that someone is deliberately trying to 'do something nasty', as the warning says.

Fortunately, we know that nothing bad is going on here. The keys on the Mac have changed because of a complete reinstall, and the network address

OpenSSH makes it clear if there's a potential security problem

If a host is unknown, SSH asks you to accept it on the first connection

has changed because a new one was picked up from the DHCP router. Fixing the problem is simple enough. All the host keys on the client are stored in the 'known_hosts' file, with the host name, IP address and key on a long single line for each host. This file is kept in the '.ssh' subdirectory of the user's home directory. If we delete the entry for the Mac and reconnect, SSH now tells us the host is unknown and asks whether to accept it (see screenshot 7). Allowing this connection writes the new information into the known_hosts file, so next time everything will proceed as normal.

Alternatively, if you have backed up the keys on the server side before a reinstall, you can restore those keys to avoid changing anything on the connecting clients and to avoid receiving any warning messages like those above. The host keys are usually stored in /etc/ssh/ on Linux distributions, and in /etc on OSX. The files in question all begin ssh_host, such as ssh_host_rsa_key and ssh_host_rsa_key.pub.

X11 forwarding

OpenSSH allows you to forward X11 (X Window) connections through a secure tunnel. The X Window System is what all Linux and most Unix machines use for their graphical subsystem. It's a network-transparent system, which means that an application can run on one machine while being displayed and controlled on another. The $DISPLAY environment variable tells the applications which display to use, so if you wanted to run Firefox on

Linux and display it on a Mac, you could use:
```
$ export ✔
DISPLAY=mymac.com:0
$ firefox
```
Connections like these go across the network unencrypted. OpenSSH's X11 fowarding option lets you send the traffic through a secure tunnel instead. Not only that, but it can also compress the traffic, which can speed things up quite a lot on a slow network. The $DISPLAY environment variable is set up for you when you log in so that the display automatically uses the secure tunnel.

For X11 forwarding to work it must be enabled in the server configuration; by default it is switched off. Find the sshd_config file (usually /etc/ssh/ or /etc) and locate the line containing 'X11Forwarding'. Change this to 'X11Forwarding yes' and ensure the line doesn't begin with a # symbol, as a hash causes the option to be ignored. The OpenSSH server must then be restarted. On OSX you can do this by stopping and starting the 'Remote Login' service under System Preferences. On Linux it varies between distributions, but running '/etc/init.d/sshd restart' usually does the trick.

To use X11 forwarding on a connection, use the -X option with SSH. To compress the connection's traffic (it works on any SSH connection) use the -C option. For example:
```
mac:$ ssh -C -X ✔
mylinux.com
Password:
linux:$
```
This will start up a new shell session that is ready to run graphical programs over the secure channel. Compression is very helpful over slow network connections, but is unlikely to be much use over a fast Lan connection. If you want to run a single command without the shell, you can specify a single command to run on the SSH line:
```
mac:$ ssh -C -X ✔
mylinux.com firefox
```
With this command, SSH would automatically run Firefox from the Linux PC over a secure line and compress the image data to speed things up. Not bad from a single line.
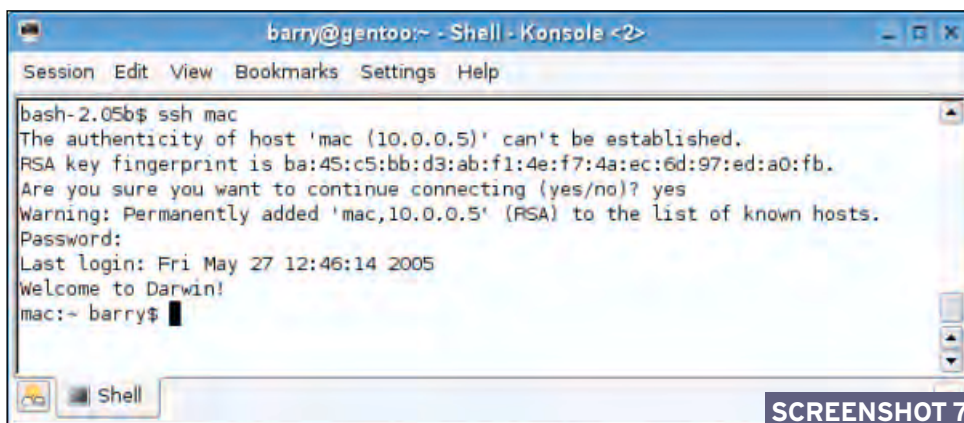
SCREENSHOT 7

Ken McMahon
is a freelance journalist and graphic designer. His involvement with digital graphics began with a Commodore 64. He graduated to Macs and now works mostly with PCs. Draw your own conclusions

What's new in Photoshop CS2

Digital camera users get a wealth of new features in Adobe's impressive upgrade

Had Adobe not rolled all of its design applications into Creative Suite, in this month's column I'd be telling you about Photoshop 9 rather than Photoshop CS2. *PCW* reviewed the entire CS2 upgrade in the June 2005 issue of *PCW*, but this is such a significant upgrade for Photoshop I feel it deserves the full Hands on treatment.

I've been using Photoshop CS2 for a couple of months now, and it's hard to imagine how I ever survived without it. All the screenshots here are from the Mac production version as I've had to uninstall the Windows beta and I don't yet have a retail version to replace it, but the two versions are identical as far as features are concerned.

The most jaw-dropping of Photoshop's new features has to be the Vanishing Point filter (see screenshot 1), which is really more of a 3D perspective environment. The Vanishing Point dialogue box can be maximised to provide a full-screen preview, and has its own toolbar. The first step is to define a perspective plane, which you do using the Create Plane tool to define four corner points of a flat surface such as a wall or window. You can then extend the plane in any direction by dragging any of its edge handles.

Next, you Ctrl-drag to tear off new planes at right angles to the first one; think of it as creating all six sides of a cube from a single face, except that you only define those perspective planes you're likely to need.

The Marquee tool conforms to the perspective of the underlying plane, providing much more intuitive selection of objects on the plane – dragging around a window frame gives you an exact selection first time. If you now Alt-drag to copy the area to a new location on the same plane, the copy is automatically scaled and transformed to maintain the perspective. If you move the copied area 'away' towards the top of a building it gets progressively smaller; move it 'closer', and it gets bigger.

But here's the best bit. If you drag the copied area around the corner onto a facing plane, it is automatically perspective-adjusted to fit. Previously, this kind of editing would have involved a large degree of time, effort and skill with
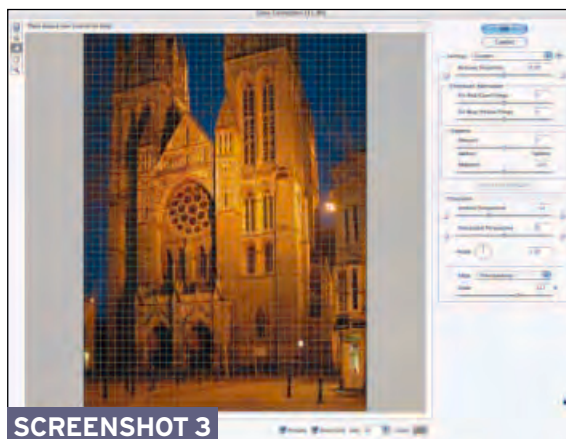

SCREENSHOT 1
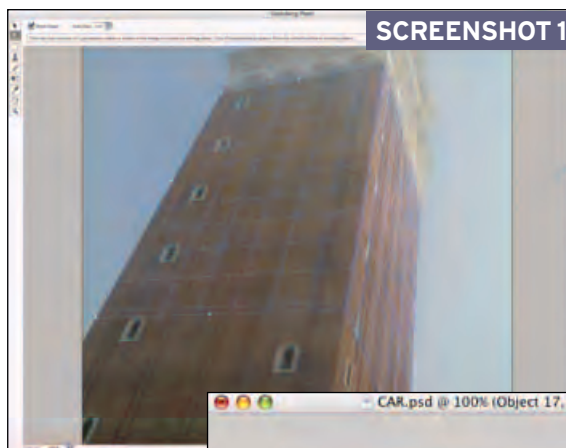
Top: The Vanishing Point filter provides perspective cut and paste, cloning and painting

Right: Choose from freeform warping in the document window, or one of the presets

SCREENSHOT 2

perspective and/or distort. Now you can effortlessly copy and move elements around an image while maintaining the perspective illusion.

The Vanishing Point dialogue box also has a Stamp tool, which displays the clone source in the brush so you can see exactly what you're going to get before you apply it. There's also a Brush tool which, like the Stamp tool, adopts the perspective of the plane on which it is used. Anything you paste into the Vanishing Point dialogue conforms to perspective

SCREENSHOT 3

planes, and you can transform floating selections by scaling and rotating them.

There are also a couple of compositing aids – you can feather the selection, change opacity and select a heal mode with luminance option to blend in with background detail. If I were to make one criticism of Vanishing Point, it's that you can't save perspective planes for an image, but they're not that difficult to produce.

Envelope distortion is a feature that's long been on Photoshop users' wish lists and now their prayers have been answered. Press Ctrl & T to invoke the Free Transform tool, and a new Warp mode button appears on the Control palette. This adds a control point at each corner of the layer, layer group, or selection, with Bezier handles extending a third of the way along each side. A mesh divides the image into nine sectors effectively making this a combined envelope and mesh distortion tool.

Custom distortions can be produced by dragging corner points, Bezier handles, edges, mesh intersections, or anywhere within the mesh area. There's also a range of custom presets, such as Arc, Arch, Bulge, Flag, Wave and Fish, which anyone who's used the Text Warp feature in Photoshop CS2 will recognise.

You can start with a preset then customise it, but you can't save your custom warps as user-defined presets. However, you can combine warps with freeform transformations (see screenshot 2). By clicking the Warp button a second time, you return to the conventional Free Transform tool and can scale, rotate and distort in the usual fashion. Click the Warp button again and your edited mesh is still intact and editable until you click the commit button.

The Lens Correction filter removes distortions and other lens aberrations, and provides perspective corrections
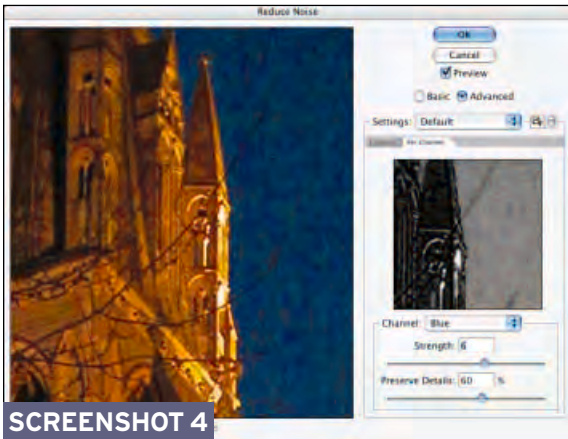
SCREENSHOT 4

This release includes a lot that's aimed squarely at digital photographers. The new Lens Correction filter (see screenshot 3) provides a multifunction dialogue box with controls for reducing pin-cushion and barrel distortion, chromatic aberration and vignetting. These tools will be of particular interest to those using lenses at the extremes of the focal length spectrum – ultra-long telephotos, zooms and fisheyes that tend to suffer more from aberrations. Of more general interest will be the Vertical Perspective Slider (there's a horizontal one as well, but it gets less, if any, use) that's used to correct converging verticals – the apparent backwards leaning of tall buildings shot with the camera pointing upwards.

The conventional way to correct this problem required a camera with an independently adjustable lens and film planes, or an enlarger with a tilting head. More recently, you could achieve the same thing digitally by tweaking with the perspective tool or using a plug-in such as Imagealign (see *PCW*, October 2003, p204). Now, you can easily straighten leaning verticals using the Vertical Perspective Slider. A grid overlay helps assess the necessary degree of correction when using this and the other lens distortion correction tools, and a new straighten tool provides one-touch image alignment when you drag it along a horizontal feature such as the horizon.

That other bugbear of digital photography – noise – is addressed in the Reduce Noise filter. In Basic Mode this provides four sliders – Strength, Preserve Details, Reduce Colour Noise and Sharpen Details – which, in the default positions, do an excellent job of reducing the kind of noise you get with consumer digital cameras used at an ISO rating of 400 and above.

Advanced Mode provides an additional tab that allows you to adjust the strength slider individually for the red, green and blue (or CMYK,

No need for plug-ins – Photoshop now has its own Reduce Noise filter

as it works in both modes) channels.

Noise is often more apparent in the blue channel, so if you're prepared to put in the effort, this is a worthwhile option. You can also save settings, which is useful as cameras tend to exhibit consistent noise characteristics at a given ISO setting. While not as sophisticated as noise plug-ins such as Neat Image (see *PCW*, May 2004, p199), Photoshop's new Reduce Noise filter will satisfy all but the most demanding users (see screenshot 4).

Unsharp Masking (USM) has always been something of an all or nothing affair. You don't always want to sharpen every bit of an image – shadows and flat (but noisy) areas of colour, such as sky and skin tones, all come out of the process looking worse rather than better. Until now the usual workaround has been to confine the USM filter using selections or a layer mask, or to duplicate and blend an unsharp masked layer with the original.

Now there's Smart Sharpen (see screenshot 5). In addition to the familiar Amount and Radius sliders, there's a pulldown menu with a choice of three types of blur removal – Gaussian Blur, Lens Blur and Motion Blur. Gaussian Blur Removal is the method used by the Unsharp Mask filter. Lens Blur Removal produces finer sharpening of detail and is less likely to cause the halo effect produced by heavy-handed unsharp masking. You can use the Motion Blur Removal option to minimise the effects of subject movement and camera shake.

The threshold slider has been replaced in Advanced Mode with two

Smart Sharpen offers three different algorithms and control of highlight and shadow sharpening

SCREENSHOT 5

tabs, which control the amount of sharpening applied to shadow and highlight areas. A Fade Amount slider reduces the degree of sharpening initially applied with the (sharpen) amount slider. You can also set the Tonal Width, which increases the range of shadow or highlight tones that are modified. There's another radius control here, defining the size of the area around a pixel that determines if it's in the shadows or highlights.

Sharpening relies heavily on visual feedback, which is one reason it's always best done at 100 per cent zoom. The Smart Sharpen dialogue box provides a big preview thumbnail and, even with the live preview switched on, works swiftly. You can save settings to disk and re-apply them from a settings pulldown menu.

If sharpness is a problem rather than a goal, there are several new blur filters to help you out, including Box Blur, Shape Blur, Smart Blur and Surface Blur. Digital photographers will find the most useful one is Lens Blur, which was introduced in Photoshop CS and is perfect for creating realistic depth-of-field effects.

Professional photographers will be pleased that Camera Raw import has been speeded up and improved. And a new High Dynamic Range (HDR) format combines multiple images into a single file that uses 32bits per pixel to store luminance data. This overcomes the perennial problem of clipping – losing highlight or shadow detail in subjects with a high dynamic range.

Adobe recommends using at least three and preferably five to seven images with Merge to HDR, shot with exposure values that differ by two stops. You can use an unexpectedly wide range of tools, adjustments and filters on HDR images and convert them to 16 or 8bit RGB and greyscale images.

There is a great deal more in this new release of Photoshop that I haven't mentioned, all of which might convince you to upgrade. I've confined my comments to features that are likely to appeal to digital photographers, but other new features, such as Smart Objects, Multiple Layer Control, Smart Guides, animation and Adobe Bridge, will appeal to a broader audience. But as far as photographers and Photoshop users are concerned, this is an upgrade you can't afford to be without.
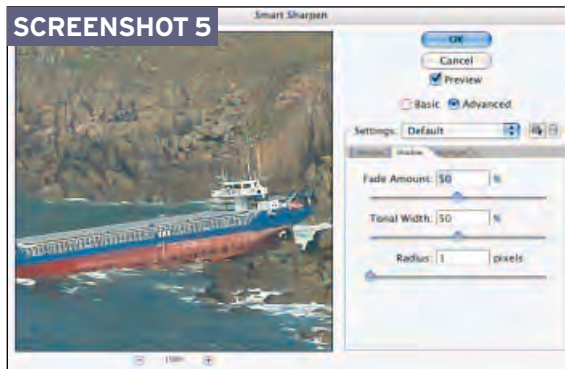
CONTACTS

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Tim Nott
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When he's not writing about Windows
and word processing, he tackles many
other diverse subjects. He currently
lives in France with his wife and family

Bookmark and hyperlink your pdfs

It's easy to create customised pdfs using a plug-in to the free Openoffice.org Writer

One thing Openoffice.org, Staroffice, Wordperfect and Ability Office have that Word doesn't is the facility to create Adobe Acrobat documents (pdfs). Wordperfect is the best at the job – when you go to File, Publish to pdf, you get an options dialogue which will let you embed fonts, fine-tune image compression, and most importantly include hyperlinks and bookmarks. The inclusion of hyperlinks means links you created in the original Wordperfect document are preserved in the pdf, so you can jump to cross-references or have live tables of contents and indexes. Any bookmarks you inserted in the original document are preserved and appear in the bookmarks tab of the Acrobat Reader navigation pane.

We'll pass over Ability Office Write for now, as it doesn't have a bookmarks feature, and concentrate on reader Tom Boyd's experience with Openoffice.org Writer. This is free or available on CD at a nominal cost, but what Tom wanted was hyperlinks between different places in the same pdf, and 'the sort of index which pops up as a set of author-provided bookmarks in a pane at the side of the document'. This is pretty much what Wordperfect offers. The native pdf-producing facilities of Openoffice.org 1.1 or Staroffice 7 are not capable of this. However, they can be given this capability with third-party extras. The slightly-less-than-good news is that this is somewhat complicated, but the best news of all is that it can be done for free.

We used Staroffice, which is functionally the same as Openoffice.org except it comes as a retail product boxed with manuals, a clip-art collection and technical support. Assuming you already have Open/Star Office and Acrobat Reader, go to **www.jdisoftware.co.uk** and download the open edition of Extended PDF. Don't open the file just yet – first download the Extended PDF User Guide. This is, unsurprisingly, a pdf file, and at some time you will need to consult it. Next, you need a Postscript printer driver. For Windows 2000 and XP users, there is one on the jdisoftware site. For other versions, the site suggests you install the Apple Color 12660 PS driver which comes

SCREENSHOT 1

SCREENSHOT 2
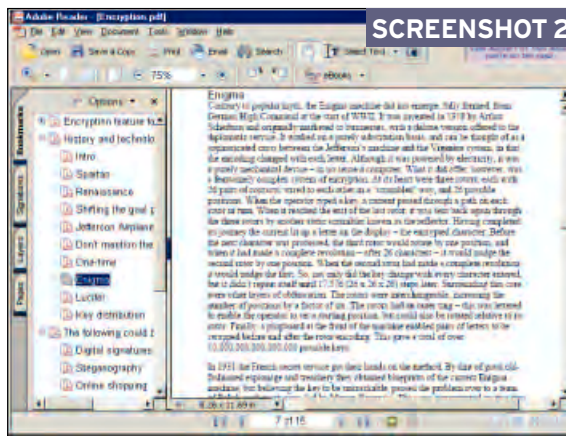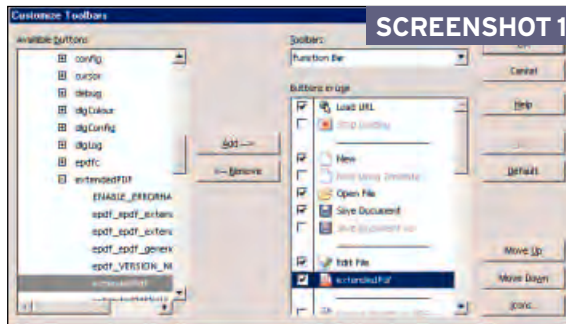
Top: It's a bit long-winded, but adding a macro to your toolbar will help create pdfs

Bottom: A pdf complete with bookmarks

with Windows. You should be able to do this from 'Add Printer' in Control Panel, Printers, but you may need the Windows installation media. When prompted to select a port for the printer, choose 'File:'.

You also need a copy of Ghost Script, which is an interpreter for the Postscript and pdf languages. Once again, jdisoftware can help, with a download of the free GPL Ghost Script. Having installed this, you'll need to restart the PC and you should then be ready to go.

The open version of Extended PDF is a .sxw document, which you can open in Openoffice Writer. With the document open, go to Tools, Macros, Macro, and when the macro dialogue box appears, click the Organiser button. In the ensuing dialogue, switch to the libraries tab. With 'soffice' selected in the Application/Document list, click the Append button. This will summon a standard file open dialogue – browse to wherever you saved the Extended PDF sxw file and select it. It doesn't matter that it is already open. Next you'll get an Append Libraries dialogue, showing the available libraries – select just the Extended PDF library. Click OK then close the

Organiser and Macro dialogues. To add the macro to a toolbar, right-click on the System toolbar, and choose Customize. In the list on the left expand 'extended PDF Open Edition basic'. Then expand two more sublevels of 'Extended PDF' until you get to a bottom-level 'Extended PDF' (see screenshot 1).

We did warn you it was slightly complicated, but you're nearly there. You can now use the Add button to attach the macro to the toolbar. Use the Move Up, Move Down and Icon buttons to finish customising. OK out of the dialogue and you are now tooled up to produce real pdfs.

The best way forward is to experiment with a sample document of a few pages, putting in bookmarks, hyperlinks to bookmarks, outline levels, notes, and so on. Once you've got a fair sprinkling of navigational features, run the Extended PDF macro. This will produce a tabbed dialogue box, and the first time you run it you will need to provide some information. In the Configuration tab, type in the name of the printer you installed earlier. You'll also need to supply the location of the Ghost Script executable – use the browse button to navigate to the gswin32c.exe file – and the Acrobat Reader executable (acrord32.exe).

The pdf will have its bookmarks created from the heading levels in the original document (see screenshot 2), rather than any bookmarks created by the author, and you can fine-tune this on the pdf bookmarks tab. Bookmarks created in the original document, however, will still be accessible from hyperlinks created in the original. Again, the best course is to experiment and read the manual.

Correction

In July's column we included a URL for a typographic space font for Wordperfect. A spurious space was inserted by a printer's devil. The URL is **http://home.earthlink.net/~wptoolbox/OtherAuthors.html#lindsayrollo**, with no spaces.

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contributor to computer magazines.
He's been writing *PCW*'s Spreadsheets
column for over 10 years. A US citizen,
he now resides on the Essex coast

Pivotal information

Discover a multitude of ways to view data by learning to make Pivot Charts

Excel has offered charting facilities for lists since version 2, the first Windows version of this popular spreadsheet (Excel version 1 was for the Mac only). But Pivot Charts weren't introduced until version 9 (Excel 2000). Unlike normal charts, Pivot Charts are created from Pivot Tables and let you interactively drag fields around on the chart.

The table and chart are linked, so if you change the layout of a Pivot Chart it changes the layout of its Pivot Table. Similarly, change the Pivot Table and the chart changes too.
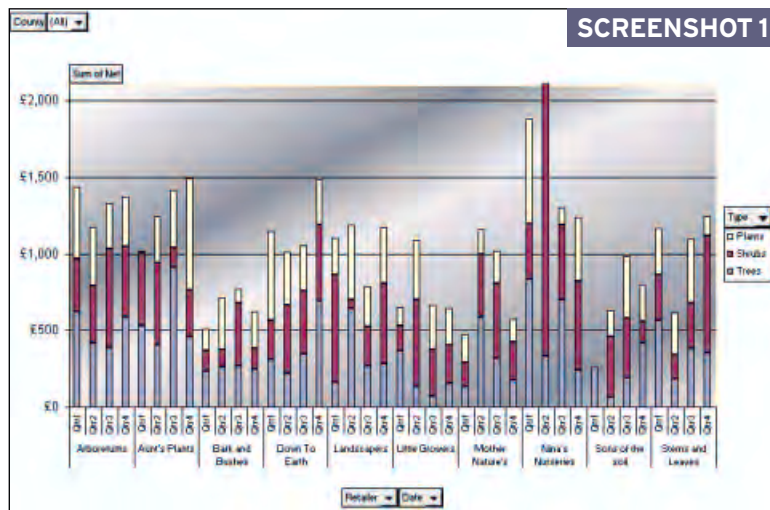
To make a Pivot Chart, you start with an Excel list. This is a simple database and follows database rules. The worksheet columns are headed with the field names; the rows hold the individual records. As an example, let's say you have six fields in which to record each sale: Date, Retailer, County, Quantity, Sales and Net. Each retailer listed has outlets in all of three counties. 'Sales' is the gross amount charged for the sale, and 'Net' is the profit on that sale.

You can't make a Pivot Chart without making a Pivot Table first, so click any cell within your list and then choose Pivot Table and Pivot Chart Report on the Data menu to start the Pivot Table Wizard. This offers you a diagram with rectangles labelled Page, Column, Row and Data. On the right-hand side are listed your field names. Click on Net and drag into the Data square. It's now labelled, Sum of Net. Drag Retailer into the Row space and Type into the Column space. Finally drag County into the Page space. Click OK and then Finish.

Right-click anywhere on the Pivot Table and choose Pivot Chart. Instantly a stacked column chart is created as this is the default type. But you can change it to any Excel chart type except X-Y scatter charts, bubble charts or stock charts, so there is a wide range of options.

You can format this to taste (see screenshot 1), although you can't resize the little dropdown field boxes. You can temporarily remove them, though, if you display the Pivot Table toolbar, click the first dropdown arrow, then the double-chevron below Options. Choose Hide Pivot Chart Field Buttons.

In the example shown there is a County field button at the top left

SCREENSHOT 1

A stacked column Pivot Chart showing retailers' quarterly profits

labelled 'All'. If you clicked the dropdown button to select just one county, not only would the Pivot Chart change but, if you returned to its Pivot Table, you would find that the same change had been made. Change the Retailer field option on the table and it's also changed on the chart. The Excel regular Undo button works, too; you can use it to restore a field change.

Let's make a bigger change. Go to the Pivot Chart and pick the last button on the Pivot Table toolbar, Show Field List. Drag the Sum of Net field button off the chart. The chart goes blank and is replaced with the words, Drop Data Items Here. From the newly displayed Field List, drag Sales onto the chart. The field button Sum of Net is now replaced with one reading Sum of Sales and, not only have all the graph results changed, but the y-axis has changed too. It was 0 to £2,000 in this example, and now it's 0 to £30,000. Right-click on the axis and reformat it to show 0 to £30,000. The related Pivot Table will

A stacked line Pivot Chart displaying retailers' quarterly sales results

show Sum of Sales as well.

To view this data as a stacked line chart with markers at each data value, right-click on the chart and choose Chart Type, then that option. You can also reverse the x-axis. Instead of displaying quarterly results for each retailer, the chart is now rearranged to display the results of each retailer within each of the four quarters (see screenshot 2). Just right-click on the Date field button and choose Group and Show Detail, Group, Quarters.

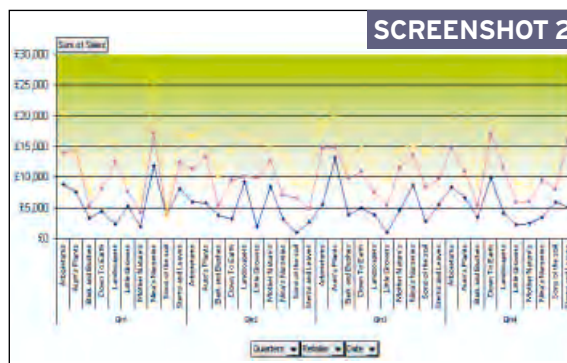Pivot Charts offer a multitude of different ways of looking at your data. Right-click on the Sum of Sales button. Choose Format Pivot Chart Field and you can change Sum to Average, Count, Maximum, Minimum or half a dozen other ways of displaying the sales results. Click the Options button, and you can choose to show the data as a running total in your choice of the base fields or as a percentage of a field.

For visual appeal, Pivot Charts offer the same formatting options as conventional charts. Right-click on either axis, any data series or the plot area and you can change gridlines, fonts, scale, alignments, colour backgrounds and fill effects, or position legends and tick marks, or add data labels.

Point to any marker on a Pivot Chart and the details are displayed. If you pointed to the first blue marker on screenshot 2 it would display Series, Trees, Point, Qtr 1, Arboretums, Value: £8,840. If you clicked on that marker, the Name box would display Series, Trees, and the Formula Bar would display the location of the source data.

Remember to keep the Pivot Table toolbar displayed and to click the Refresh Data button frequently.

SCREENSHOT 2

Nigel Whitfield edited computer magazines before going freelance in 1995. A specialist in Internet and consumer issues, he has a degree in Computing Science from Imperial College

Serving up simplicity

Setting up a test web server on your PC is a lot easier than you might think. Here's how

G etting your website right before the public can see it is obviously desirable, and even more so if it's for a business rather than a home page. But unless you're unusually infallible, it's almost inevitable that you'll spot annoying mistakes, such as typos or glitches in scripts.

So, the big question for most people is how can you minimise that? If you have a static site, previewing it in your browser is a reasonable option, but things start to become trickier if the site is dynamic. For a commercial site, the solution is called a 'staging' server, where you can upload the site and test it in an environment that closely matches the live one, but without the public able to connect. It's a great idea, but hardly practical for the home or small business, you might think. After all, it could entail hiring more server space, and it might be hard to set up, or to restrict access.

I've been playing with a couple of tools that make it much easier, and can even help you test sites that rely on PHP and databases.

You can install Apache on Windows and add databases such as MySQL, but this can be complex. My aim was to have something that could be set up easily, would support PHP, and not need hours of tweaking configuration files; I don't mind doing that on Linux/Unix platforms, but not on Windows. In addition, many readers of this column might be fine with the web design and development side of things, but not too keen on understanding the internals of a server.

Into the Abyss
There are lots of web servers for Windows, some simpler than others. After a bit of searching, we opted for Abyss Web Server X1, from Aprelium Technologies (**www.aprelium.com**). It's free and has the important advantage that it's available for Mac OSX and Linux too (see screenshot 1). Configuration is done by a built-in web-based management interface, so there are no config files to worry about, and it supports scripting and CGI, so you can recreate the key parts of your live setup easily. It has a pretty small footprint on your system, so you won't find performance compromised too much

SCREENSHOT 1
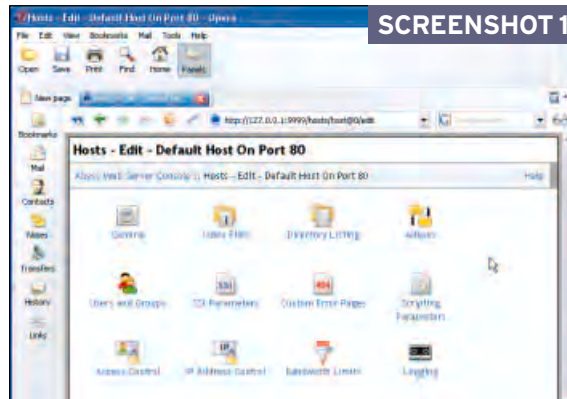
Above: Aprelium's Abyss Web Server X1 is free for Windows, Mac and Linux, and doesn't need lots of text configuration files

Right: The Windows installer for PHP will add PHP 5 with the SQLite database to your Abyss web server
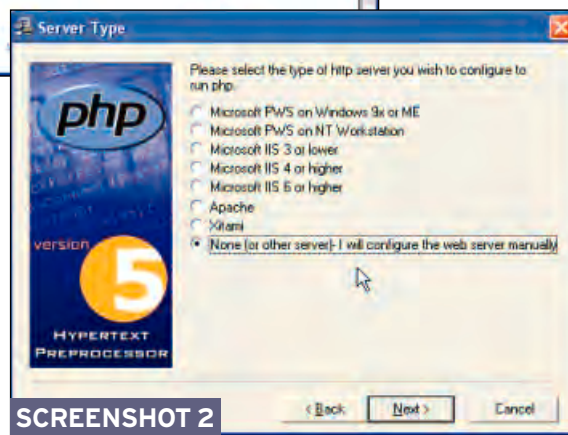
If you're using Dreamweaver, you'll have to do without code hints when you're writing PHP for the SQLite database engine

SCREENSHOT 2

SCREENSHOT 3

if you're running it on the same PC as your web development tools.

Other useful features include simple-to-configure access controls, which means it's also fairly straightforward to configure to use on an intranet, where you might want some folders only accessible to certain users. You won't need as big a machine as IIS, and you won't have to tinker with .htaccess files, as you do on Apache.

So, to get started head over to **www.aprelium.com** and click the Free Download link on the front page.

Installing the server is very simple – just a matter of working through the install wizard, and then when you're connected to the admin server running on your PC, you need to create an administrative user name and password. Fire up another web browser, point it to 127.0.0.1, and you should see the default home page for Abyss which, if you did a standard installation, will be in C:\Program Files\Abyss Web Server\htdocs on a PC.

You can change the settings of the server very easily – just click the Abyss icon in the system tray and choose Show Console to reach the management pages, sign in with the name and password you created during setup, and click on the appropriate option to change things. If you make a change that requires a restart of the server, you'll be told, and you can restart just by clicking a button. The most important difference to be aware of between the free version and the commercial ones is that the free X1 server can only support one host on your machine, while the commercial version will let you have multiple virtual hosts – but for small intranets, or testing your pages, that shouldn't be too much of an issue.

Using PHP
Abyss will let you serve static sites and you can simply tell your favourite web-editing program to publish to a local folder or share the Abyss htdocs folder over your network. But as we said at the beginning, it's often the more dynamic sites that need thorough testing and checking before you let the public loose on them. In the Web development column, as many regular readers will know, our dynamic tool of choice is PHP, often coupled with MySQL.

You can run MySQL with PHP on the Abyss server, but to do that with PHP, you'll need to compile PHP yourself; the standard Windows
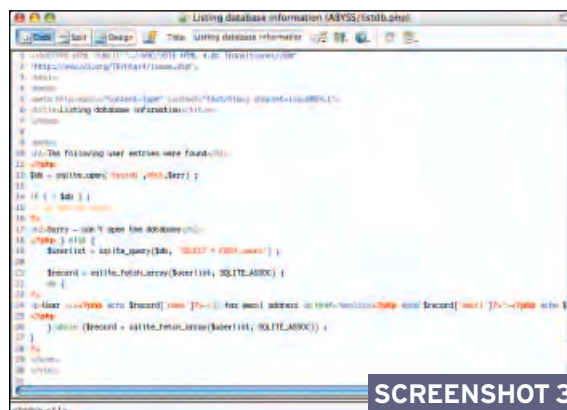
installer package from the PHP website is for PHP 5, which includes the SQLite package by default (see screenshot 2). There are pros and cons to both. If you're creating a large site, using MySQL is almost certainly the better option – it's more scalable, and client-server, so you can move the database to a different machine.

But for a simple site that won't be needing too much database work, SQLite is easy and won't require complicated additional setup. There are some other drawbacks, which I'll return to later. For now, though, go to the PHP website and grab the Windows Installer version of PHP. There are detailed instructions on the Aprelium website for how to configure things; essentially, you just need to tell the PHP installer that you're using an 'other' web server, and then use the Abyss web interface to locate the php_cgi.exe file, associate it with files ending in .php and add index.php as a valid index file, so that it will be looked for when you end a website address with a /, alongside index.htm and index.htm.

Incidentally, if you're a Mac user Aprelium has an installer for PHP that you can download from its site, which includes PHP 4.3.10 with MySQL support, which may be more useful for some developers. Meanwhile, back in the world of Windows…

SQLite
SQLite is quick and simple – we'll go through some examples in a moment – but first there's one bugbear, which is that if you're a Dreamweaver user, you're stuck with using PHP4 and MySQL for developing dynamic sites. Macromedia doesn't support other databases, though the PHAkt package from Interakt (**www.interaktonline.com**) supports some others via ADODB, but needs you to have Ultradev.

The upshot is that while you can still code for other databases in Dreamweaver using PHP, you don't get the benefit of the hints when you're typing the names of functions (see screenshot 3), which make sure you give the right parameters, and you can't use the Dreamweaver tools to help you construct your queries. That's annoying, to put it mildly, since being able to use the recordset tools in Dreamweaver can make setting up a basic site a lot easier.

We'll investigate other tools that can help with this in a future column, but for now, we'll look at some simple SQLite scripts that you can use on the Abyss web server with the Windows version of PHP 5, and how different

those are from the versions that Dreamweaver would have created for using with MySQL.

Creating a database is simple with SQLite – unlike with MySQL, you don't need to create it beforehand, and set the permissions – often one of the most fiddly tasks for new users. The simple script in figure 1 creates a one-table database, and adds two records to it.

The functions aren't that different from the ones you'll be used to for MySQL, though there's no need to select a database on the server, or specify a user name and password.

The 0666 parameter in the sqlite_open function is the file mode, in this case read write for everyone; on Windows it's not going to make much difference; if the database file doesn't exist, it'll be created automatically for you.

FIG 1

```php
<?php
 $db = sqlite_open('testdb', 0666, $dberror) ;

 sqlite_query($db, 'CREATE TABLE users ✔
( name varchar(20), email varchar(60))') ;
 sqlite_query($db, 'INSERT INTO users (name, ✔
email) VALUES ✔
(\'gorby\',\'gorby@kremvax.ru\')') ;
 sqlite_query($db, 'INSERT INTO users (name, ✔
email) VALUES ✔
(\'fred\',\'webdev@pcw.co.uk\')') ;

?>
```

FIG 2

```php
<?php
$query_news = "SELECT message, `date` FROM ✔
sitenews ORDER BY `date` DESC";
$news = mysql_query($query_news, $toppyDB) ✔
or die(mysql_error());

$row_news = mysql_fetch_assoc($news);

do { ?>
  </p>
<p align="left" class="smallText">✔
<?php echo $row_news['date']; ?>
  <p align="left" class="descriptive✔
Text"><?php echo $row_news['message']; ?>
<?php } while ($row_news = ✔
mysql_fetch_assoc($news)); ?>
```

FIG 3

```php
<?php
$userlist = sqlite_query($db, 'SELECT * ✔
FROM users') ;

$record = sqlite_fetch_array($userlist, ✔
SQLITE_ASSOC) ;

do { ?>
<p>User <i><?php echo $record['name']?></i> ✔
has email address <a href="mailto:<?php echo ✔
$record['email']?>"><?php echo ✔
$record['email']?></a>.</p>
<?php
        } while ($record = sqlite_fetch✔
_array($userlist, SQLITE_ASSOC)) ;
?>                              (Key: ✔ code string continues)
```

Recordset retrieval
When you're using MySQL, the procedure for retrieving a set of records is to open the database, send a query using the database handle, and then use the result handle that's returned to go through the recordset, processing the results however you like.

If you use Dreamweaver to code this for you, you'll end up with something a little like the code shown in figure 2 in your PHP.

Coding a similar query, from a two-column table in SQLite by hand can be done with the code shown in figure 3 (we've omitted the sqlite_open function for brevity).

Of course, there are other ways of doing this, but the main point here is that with relatively few changes, you can alter your code from running under MySQL to SQLite pretty simply, and that still holds true for code that was generated for you by Dreamweaver, or other development tools.

The mysql_query function changes to sqlite_query, and the order of its parameters swaps round. Instead of

`mysql_fetch_assoc($result)`

you can use

`sqlite_fetch_array✔($result, SQLITE_ASSOC)`

(Key: ✔ code string continues)

The second option is a constant, and needs to be in upper case.

This is a very simple example, and I wouldn't suggest you spend hours rewriting a large website just so you can test it on a local server running Abyss and PHP/SQLite. But if it's a simple data capture application, for example, with relatively few dynamic pages, and without seriously complicated database functions, it's not completely impractical to use Dreamweaver's features to code against the PHP/MySQL model, and then tweak for SQLite running on an in-house test server.

If you're doing a lot of manual coding, you could even consider abstracting the database functions into a library, so you can change a constant in one of your files to decide whether to use SQLite or MySQL, without changing any more code.

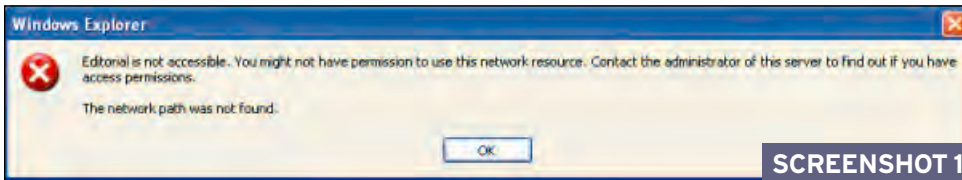In the next column, we'll investigate enclosures in RSS 2.0.

CONTACTS

Hands on Web development will return in November's issue. Nigel Whitfield welcomes your comments on the Web development column. Email him at: webdev@pcw.co.uk. Please do not send unsolicited file attachments.

Alan Stevens
has been implementing and supporting networks for over 25 years, working for IT vendors, systems integrators and customers. He now mostly researches and writes about networking matters

Communication breakdown

Some tips on how to tackle browsing and access problems in Windows networking

SCREENSHOT 1

Browsing problems and error messages like this are all too common on newly installed Windows networks

Windows networking is a lot easier than it used to be, with wizards and other tools to handle most of the hard bits. But problems can still arise, not so much with basic connectivity, but in terms of browsing and accessing shared systems once the network is up and running. One of the most common problems is an inability to see other computers in My Network Places or Windows Explorer, even though they can be pinged from the command line. Even when other systems can be seen, access is often denied, with error messages, such as that in screenshot 1, a common sight on newly installed Lans.

Unfortunately there's no easy solution to this kind of networking problem, and troubleshooting can be a lengthy and frustrating business. Still, it can be done, and the following is a guide to some of the more obvious culprits.

The right workgroup
Although unlikely to be the prime reason for such problems, it's a good idea to ensure that all the computers on your network are in the same workgroup. If you've configured a Windows domain this isn't necessary, but on a peer-to-peer network problems can arise with the workgroup name, especially when mixing different versions of Windows.

That's because Windows 2000 and Windows XP Pro both use 'WORKGROUP' as the workgroup name (as does Windows 95/98), but on Windows XP Home the default is 'MSHOME.' It's worth checking the name used, ensuring every PC has the same setting, and changing the name to something unique and meaningful. You can use up to 15 characters, but keeping the name short makes life easier, and avoid spaces – this also applies to individual host names. Strictly speaking, spaces have been allowed from Windows 2000 onwards, but some printer drivers object to spaces in workgroup names and older systems definitely don't like them. So,

SCREENSHOT 2

for example, rather than calling a network 'THE SMITHS LAN' I would go for 'THESMITHS', and keep the host names short and to the point. Changing host and workgroup names is quick and easy; in XP, for example, it can be done from the System Applet in the Control Panel (see screenshot 2).

However, specifying the wrong workgroup name on a PC shouldn't stop you browsing the network or accessing network resources. Rather, most network-browsing problems are related to the way Windows resolves human-friendly host PC names to the IP addresses it needs to communicate with them, and vice versa.

What's in a name
The simplest way to check whether problems with name resolution are stopping you browsing the network is to try and connect to a remote computer using its IP address. If, for example, you can locate a network PC by searching for it by address (see screenshot 3), but not when you search by name, then you can be pretty sure that naming is at fault.

If you prefer to use the command line, you could try and get a directory listing using a UNC path, starting

Make sure the workgroup name is the same on all PCs and avoid spaces in workgroup and host names

If you can find a network PC using its address but not its name, then you have a problem with network name resolution

with the remote PC name and then its IP address. But whatever the technique, desktop firewalls are the most common cause of such problems, whether it's the software now included with Windows XP or any of the third-party products routinely supplied with new PCs.

The reason for this is simple – most firewalls allow TCP/IP traffic through by default, but it's commonplace to block the ports required to resolve network names, share files and so on. After all, when you only have an Internet connection to worry about, you want to stop people hacking into your PC. However, if the same rules are applied to Lan connections, they're just as adept at stopping you browsing the network and connecting to file and printer shares.

Firewall troubleshooting
To start troubleshooting, it's a good idea to turn off any desktop firewall software, at least temporarily. Start with just one PC and if turning off its firewall fixes the problem, or modifies the symptoms, you'll know it's to blame and can find a solution.

One such solution would be to forego desktop protection and use a separate, independent firewall to secure the network as a whole. Most broadband routers, for example, now come with a firewall, and if you're using Microsoft ICS (Internet Connection Sharing), you only need to protect the central gateway PC with the modem attached. Add in Network Address Translation (Nat), again included as standard on most routers and ICS, and you're pretty secure from incoming threats even without individual desktop protection.

SCREENSHOT 3
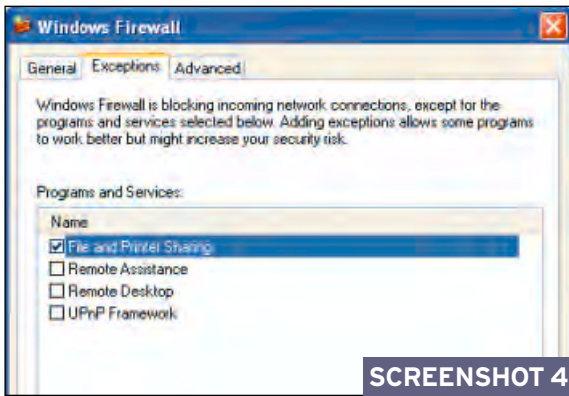
SCREENSHOT 4

However, if you want the added security of a desktop firewall to monitor rogue outgoing connections, you'll need to look for ways of differentiating between Internet and local network traffic. How you do this will depend on the software concerned, although it's not always necessary to know exactly what ports need to be opened or define complex rules to do so. With XP Service Pack 2 (SP2), for example, the built-in Windows Firewall lets you define exceptions to its default blocking rules simply by ticking a box, and File and Printer Sharing is one of the predefined options (see screenshot 4).

The File and Printer Sharing exception should have been configured automatically if you used the Network Setup wizard. However, check and apply SP2 if you haven't already done so, as the firewall is a lot simpler to control with SP2 in place. In addition, it lets you disable the firewall on specific connections and define your own exceptions if required.

File sharing

If network problems persist, the next thing to look at has to be Windows file sharing itself. This can cause the problems described, especially when mixing different versions of Windows; due mainly to the various ways in which Windows can manage access to network shares.

With Windows 95/98/ME, you only had password protection of individual shared folders. However, when the NTFS file system came along (in Windows 2000), access control lists (ACLs) were added to manage access on an individual user or group basis.

The ACL approach is more scalable, flexible and secure, although on a peer-to-peer network you have to define a matching user account on each PC you want to access. So if you log on to your PC as JOEBLOGGS, for example, you'll need a JOEBLOGGS account on every other system on the network that you want to connect to.

With Service Pack 2 installed, the Windows XP firewall can be easily configured to allow file- and print-sharing traffic through

With Simple File Sharing all network users are authenticated using the local guest account, and you have limited control over the level of access allowed

And there's a further complicating factor with Windows XP – simple file sharing (SFS).

Not so simple

SFS eschews full ACL control in favour of assigning rights to the built-in Everyone group whenever a new share is defined. Instead of using their own names, remote users are authenticated using the built-in Guest account, so there's no need to configure individual user accounts on every PC.

SFS also blocks direct access to the ACLs, so the only options are to allow read-only access or let other network users modify the contents of a share (see screenshot 5). The benefit is that you don't really have to manage the file-sharing process. Share a folder and anyone on the network can access it. However, folders are either shared or not, with crude controls over what remote users are allowed to do. It can also lead to other problems, especially when upgrading older PCs and mixing different versions of Windows.

If you convert from Fat to NTFS (for example, when upgrading to Windows XP from Windows 98), the Everyone group isn't automatically added to existing ACLs. Users will find that they can't access the shares on the upgraded PC although the user of the converted system can still connect to shares on others.

This is easy to fix. Just stop sharing the folders concerned and define them again under XP. But note that administrative shares (such as C$) won't be visible with SFS, as remote users are authenticated as Guest and won't have the administrative rights needed to view these resources.

SCREENSHOT 5

Remote administration and Registry editing won't work properly either, even where the remote user is logged on as Administrator with the same password as on the host system.

With XP Home, there's not much you can do other than live with these limitations, whereas with XP Pro you can turn off SFS and revert to the more granular ACLs found in Windows 2000. To do this, double-click My Computer and select Folder Options from the Tools menu. Click the View tab and look for the entry marked Use simple file sharing (Recommended).

With SFS turned off, you're in full control of file sharing and problems on mixed networks are easier to resolve, but it is down to control access on a user or group basis, just as with Windows 2000.
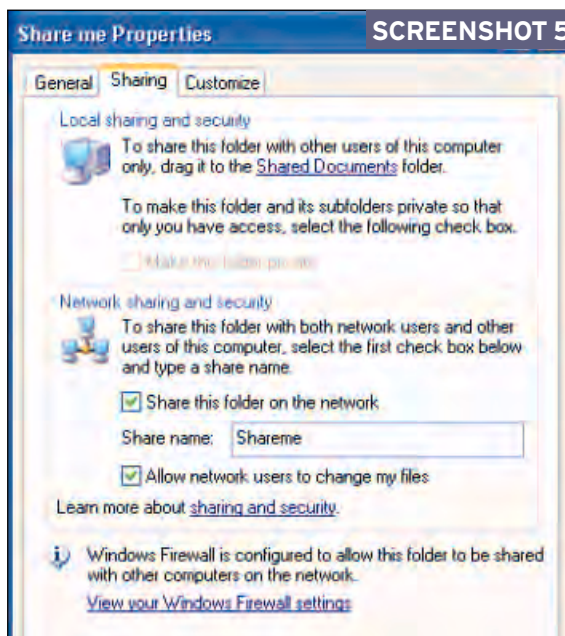
The Netbeui option

You may see suggestions on some web forums that you can overcome naming problems by installing Netbeui – the network transport used on early Windows networks to carry the Netbios naming information. Others will tell you to use the Novell IPX/SPX protocol, or recommend WINS (the Windows Internet Naming Service). All three have their merits and can help when mixing old, pre-Windows 2000 systems with later PCs, and on networks divided into logical sub-nets. But for the most part there's no need to resort to such methods, most of which involve digging out the original installation CD-Roms and loading up unsupported legacy software.

In fact, for a long time, the TCP/IP protocol included with Windows has had optional Netbios naming support built in, which is more than adequate for most peer-to-peer networks. You just have to ensure that the appropriate option is turned on.

Checking is very easy. On a Windows XP system, for example, open the properties of the network connection and double-click the Internet Protocol (TCP/IP) entry. Click Advanced then choose the WINS tab, and you'll see and be able to modify the Netbios setting.

There are lots of other reasons you might have problems browsing and accessing network resources. I've covered the most common here, but if you come across any others you think worth mentioning, drop me a line at the email address below.
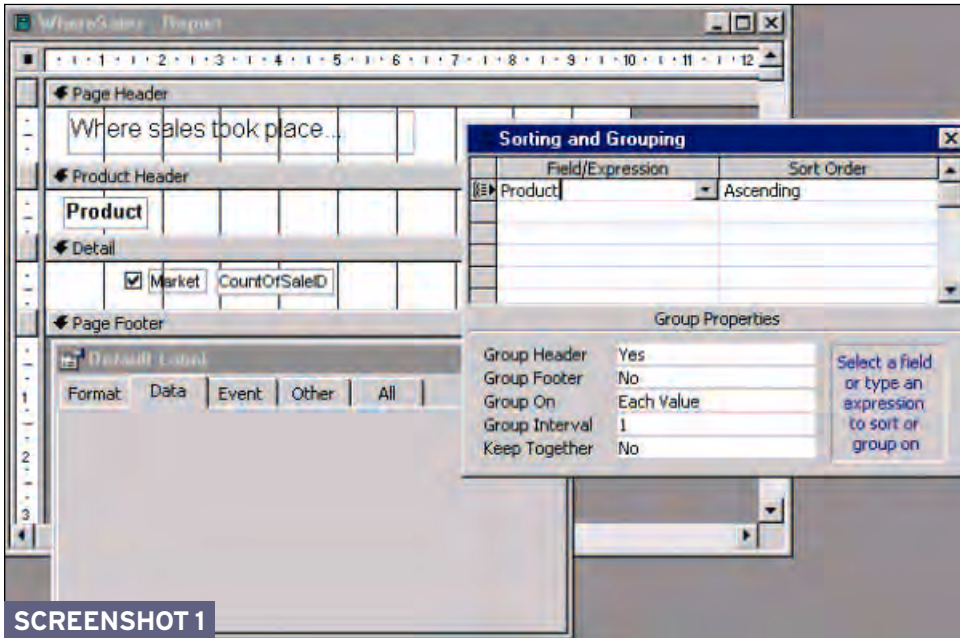
Mark Whitehorn
is one of those lost souls who
actually likes databases. He splits
his time between consultancy,
writing, working for two universities
and tinkering with old cars

Field reports and family problems

How to present results without tickboxes; and why a single query isn't always best

SCREENSHOT 1

Setting the Sorting and Grouping levels is one of the first steps in achieving the required result

TABLE 1

SaleID	Product	Market
1	Eggs	Yes
2	Honey	Yes
4	Honey	No
5	Honey	No
6	Eggs	Yes

TABLE 2

Product	CountOfSaleID	Market
Eggs	4	Yes
Honey	3	Yes
Eggs	3	No
Honey	4	No

TABLE 3

SaleLocation	Product	CountOfSaleID
Sales at Farmers Market	Eggs	4
Sales at Farmers Market	Honey	3
Sales at farm gate	Eggs	3
Sales at farm gate	Honey	4

In the May issue I looked at the gentle art of counting the entries in Yes/No fields in Access. The question has re-emerged from the reporting perspective. Carol Prince has a table with a Yes/No field recording whether a sale was made at the local farmers' market or at the farm gate. She wants a report to show where sales for each product occurred. Simplistically, this looks like table 1.

Here's a rapid recap: to create a query to count the number of yes and no entries, put all three fields from table 1 into a query grid and add a Totals row by clicking the Totals button from the top menu bar. Set the Totals row to 'Count' for the SaleID field and leave it as the default 'Group By' for the Market Yes/No and Product fields. This will count each sale and group them by the entry in the Market field and by product, giving four permutations (see table 2).

Here's the SQL:

```
SELECT Sales.Market, ✔
Count(Sales.SaleID) AS ✔
CountOfSaleID, ✔
Sales.Product
FROM Sales
GROUP BY Sales.Market, ✔
Sales.Product;
```
(Key: ✔ code string continues)

Save the query as YesNoCount. Of the results generated by this query, Carol wants to see sales at both locations for each product.

Create a new report by clicking the New button, choosing Design View and basing it on the YesNoCount query. Place all three fields from the query onto the Detail section of the report, then click the Sorting and Grouping button in the top menu bar. In the Field/Expression column of the Sorting and Grouping dialogue, select the Product field from the pop-down list, and set the Group Header property to Yes. A new section appears in the report, labelled Product Header: drag the Product field up into this new section (see screenshot 1).

Given a little resizing and aligning, the report, called WhereSales, looks like screenshot 2.

This has all the information, but readable descriptions would be better than tickboxes. One way to do this is to use a query that interprets the ticks and not ticks in the Yes/No field and converts them to reasonable wording.

The basic data is in the YesNoCount query (sales for each product), so we'll base the new query on this. Start creating a query in Design view and base it on the YesNoCount query rather than on a table. Add the Product and CountOfSaleID fields. The third field interprets the Market field, so in the Field row, type:

```
SaleLocation: ✔
Iif([Market],"Sales at ✔
Farmers Market","Sales ✔
at farm gate")
```

This defines a new field in the answer table called SaleLocation. The Iif function says look at the Market field and if it's set to True (that is, it contains a tick) write the words inside the first set of quotes into SaleLocation field. If Market is set to False (it contains no tick), write the words in the second set of quotes into the field. The SQL is:

```
SELECT IIf([Market],✔
"Sales at Farmers ✔
Market","Sales at farm ✔
gate") AS SaleLocation, ✔
YesNoCount.Product, ✔
YesNoCount.CountOfSaleID
FROM YesNoCount;
```

The Datasheet view shown in table 3 is exactly what we want, so save the query as SaleLocation. The new report is built in the same way as before except that it's based on our new SaleLocation query. Add all three fields into the Detail section as before, add a Product Header using the

Family values

Nigel Williams runs a club membership database in Access 2000: it comprises a table of addresses and another of individual members at each address, the two tables having a one-to-many relationship based on a common ID field. Nigel wants a query that will generate a single record for each address which lists all the individuals from that location and which copes with varying numbers of people at each address.

Generally speaking, I wouldn't try to do this as a single query; I'd use a query to find the data and then use a report to present it in the way required. However, this is a reasonable frequently asked question, so I've found a solution that should work for Nigel and, in the light of the description of its workings, I'll also use it to illustrate why this is not an optimal solution.

The two tables in the membership database might look like table 4. The Address table is straightforward.

The People table (table 5) has a field PersonID to identify each person uniquely, an AddressID field to tie each person to their address in the Address table and a field called FP (for Family Position) which ranks them within the family. This ranking may be based on anything, such as age, length of hair, or order in which they joined the club.

We need a way of identifying groups of people by their FP rating, so first we'll build a query to find

TABLE 4

AddressID	Address1	Address2
1	23 Acacia Gardens	Honeybourne
2	4 Church Row	Wittlingford
3	9 The Oaks	Longford

TABLE 5

PersonID	FirstName	FP	AddressID
1	Fred	1	1
2	Sally	2	1
3	Jane	1	2
4	Brian	2	2
5	Horatio	3	2

TABLE 6

AddressID	FirstName	FP
1	Fred	1
2	Jane	1
3	Jan	1

TABLE 7

AddressID	Address1	First.FirstName	Second.FirstName	Third.FirstName	Fourth.FirstName
2	4 Church Row	Jane	Brian	Horatio	Winston

TABLE 8

AddressID	Address1	First.FirstName	Second.FirstName	Third.FirstName	Fourth.FirstName
1	23 Acacia Gardens	Fred	Sally		
2	4 Church Row	Jane	Brian	Horatio	Winston
3	9 The Oaks	Jan	Kim	Karl	

everyone in FP1. The query includes the AddressID, FirstName and FP fields and has a criterion of 1 set for the latter (see screenshot 4). The SQL looks like this:

```
SELECT Address.✔
AddressID, People.✔
FirstName, People.FP
FROM Address INNER JOIN ✔
People ON ✔
Address.AddressID = ✔
People.AddressID
WHERE (((People.FP)=1));
```

The result is shown in table 6, which is perfect: we've identified all the FP1s in this query, called First in the DBCSEP05.mdb. If you've bought the DVD edition of *PCW* you'll find this file on the cover disc. It's also at **www.penguinsoft.co.uk**.

You'll need further queries for identifying the other positions, all of the same format but with different criteria for the FP field: queries called Second, Third and Fourth are also in the .mdb file.

Now we need a query to pull all these together, showing the address and all the incumbents. Base this query on the four queries described above and the Address table: from First, include the AddressID and FirstName fields, and from Second, Third and Fourth include just the FirstName field. Finally, add the Address1 field from the Address table. In the Query/Table pane you'll see that there are no joins between the queries. If you run the query like this you'll get a nonsensical answer (called a Cartesian product) because Access tries to be helpful and give you all possible permutations.

So we need some joins. Drag four into place: each one starts from the AddressID field in the First query and runs to the AddressID field in the Second, Third and Fourth queries, and to the AddressID field in the Address table. Try running the query. The results are shown in table 7.

It's working but not quite as we want. It shows the address and family members, but only for families comprising four members. We want to see all families, regardless of the number of individuals therein. Let's look at those joins in more detail: right-click on the First to Second join line and select Join Properties. Of the t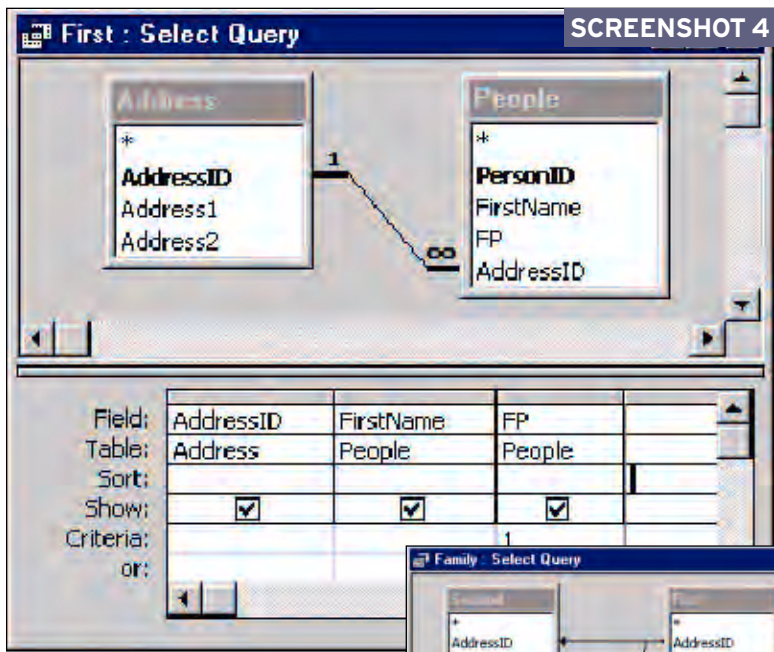hree options, the second looks promising: 'Include ALL records from First and only those records from Second where the joined fields are equal'. This forces the inclusion of all the records from the First query – all the FP1 people – and if there is a matching instance of the joined field (AddressID) in the Second query, include this in the answer table. Select the second option in the Join Properties dialogue and click OK. The join line now has an arrowhead at one end. Repeat this for the

SCREENSHOT 2

Above: The first attempt at a report: it has undesirable tickboxes

SCREENSHOT 3

Right: The final report with descriptions instead of tickboxes

SCREENSHOT 4

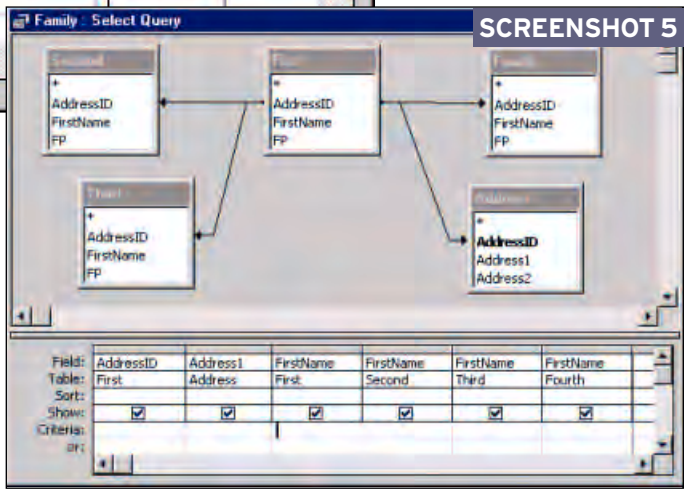**Left: This query finds everyone with a Family Position rating of 1**

Below: The four joins with their Join Properties tweaked

SCREENSHOT 5

remaining three joins (see screenshot 5) and run the query again.

Table 8 shows the results and that gives Nigel his desired answer. The SQL for this query, called Family, is shown in figure 1 below. The 'left join' tells the query to include everything from First and only matching records from the other queries.

We have exactly the answer we wanted, but as I said earlier this is not the best solution. As a confirmed relational database theory zealot, my problem is that the query itself limits the set of data that the query can return. However many sub-queries you have, an instance may arise where you have a larger number of individuals at an address.

The joy and delight of a relational database is that whatever question you ask, you'll always receive a complete and correct answer. The solution above negates this wondrous facet of relational databases which is why I wouldn't go down this path.

Having said that, the solution is, in fact, rather fun and perfectly acceptable for a small database where the developer and user are one and the same. I couldn't recommend it for a mission-critical 24/7 pan-galactic database.

Clasp an ASP

Last month we looked at the difference between ASP and ADO. This month I've some useful ASP books to suggest, and next month we'll look at a couple of ADO books.

ASP.Net in a nutshell 2nd Ed
Duthie & MacDonald (O'Reilly), ISBN 0596005202, £31.95
A large nutshell, this: maybe a coconut. It's a reference book aimed at experienced web developers in transit from ASP to ASP.Net.

The first quarter is a quick-start tutorial, followed by two reference sections. The first is on 'classes': effectively blueprints for objects that can be used many times. Eight major

classes are described with troubleshooting tips and detailed property information. A Namespace reference and appendix complete the content. Knowledge of C# and web development is assumed.

ASP.Net cookbook
Kittel & LeBlond (O'Reilly), ISBN 0596003781, £28.50
This provides 'recipes' for solving web application development problems. The 18 topics include data validation, user controls (encapsulating controls and code into re-usable parcels), error handling, HTTP handlers and a catch-all 'Assorted Tips'. Each problem and solution is described, followed by discussion and code.

Perhaps not the first book you should buy, but once you're snagged in the ASP.Net, it could prove invaluable.

Programming ASP.Net 2nd Ed
Liberty & Hurwitz (O'Reilly), ISBN 0596004877, £35.50
A good starting point for anyone new to ASP.Net, this book aims to impart all you require to use the technology successfully. It starts with an introduction to ASP.Net and the .Net Framework and includes a classic first project: a 'Hello World' application. Sample code is given in C# and VB.Net (experience in these is assumed) with some in original ASP as well. Later chapters cover data access with ADO.Net, data updating and the implementation of transactions.

Beginning ASP.Net 1.1 Databases
Foggon & Maharry (Apress), ISBN 1590593693, £25
Aimed at those without database experience but with ASP.Net knowledge, the book is designed to be read from start to finish, rather than dipped into as a reference. The first chapters introduce ASP.Net, ADO.Net and databases. Later chapters cover connecting an ASP.Net page to a data source, aspects of ADO.Net such as handling query results, and SQL's DDL (Data Definition Language). There's also an overview of designing a database-driven website illustrated with a case study.

CONTACTS
Mark Whitehorn welcomes your comments on the Databases column. Email him at: **database@pcw.co.uk**. Please do not send unsolicited file attachments.

FIG 1

```
SELECT First.AddressID, Address.Address1, First.FirstName, ✔
Second.FirstName, Third.FirstName, Fourth.FirstName
FROM (((([First] LEFT JOIN [Second] ON First.AddressID = ✔
Second.AddressID) LEFT JOIN Third ON First.AddressID = ✔
Third.AddressID) LEFT JOIN Fourth ON First.AddressID = ✔
Fourth.AddressID) LEFT JOIN Address ON First.AddressID = ✔
Address.AddressID;
```
(Key: ✔ code string continues)

Tim Anderson
is both an IT journalist and software developer, and began writing for *PCW* in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet

Visual programming ‹‹Hands on

Trojan war hero tackles browsers

How Ajax makes the surfing experience better; and Jbuilder gets eclipsed

The latest buzzword in web applications is Ajax – Asynchronous Javascript and XML. Ajax is not a new technology, but is a new term coined by Jesse James Garrett at the consulting company Adaptive Path to describe how new web applications from Google and others are put together.

Although Google does not use the term, the archetypal Ajax application is perhaps Google Maps (**http://maps.google.com**), still in beta at the time of writing. This lets you scroll and zoom into maps retrieved from the Internet with almost the ease and smoothness of a local application.

Ajax enables several features. First, instead of refreshing the whole page when the data changes, an Ajax application only refreshes the part that has changed, eliminating page flashing (see screenshot 1). Second, after the initial page load, less data is transferred from the web server, making the application more responsive. Third, the asynchronous aspect provides a usable page at all times, rather than an hourglass or ugly white-out while the page reloads. That reduces the load on the web server, improving scalability and reducing costs.

It is fair to say that an Ajax application is an advance over classic browser-based web applications. Features can be mixed and matched; so, for example, it is not necessary to use XML to have partial page refresh – sometimes changing the SRC attribute of an image in script is enough.

The curious thing about Ajax is that it represents a change of attitude rather than a new development platform. For many years, the leading

SCREENSHOT 1

browsers have supported a powerful scripting language, Javascript, along with the ability to manipulate a web page by programming to its Document Object Model (DOM). The problem with the DOM is that there are implementation differences between browsers. Some developers minimised use of Javascript and the DOM, so their application would run without compatibility issues. Also, a key component of Ajax, the XMLHttpRequest object, was invented by Microsoft and originally only supported in Internet Explorer, putting off developers who wanted cross-browser support.

Now the essentials for Ajax are widely supported, not only in IE but also in Firefox, Opera and Apple's Safari. In addition, Google's developers decided that any amount of complex client-side Javascript was worth it if it helped deliver a better user experience. The result is that

At runtime, the user can call the web service without any flickering from page refresh

browser compatibility is limited with Google's applications, which is an issue if you try using an older browser or a device such as a smartphone or PDA. The trade-off seems to be worthwhile for Google, which has received excellent feedback for applications such as Maps and Gmail.

A simple Ajax example

The following Ajax example is a web application that displays the current time as reported by the web server. It has two components. A .Net page called gettime.aspx outputs an XML document representing the current time. You can create this in Visual Studio or using a text editor. For something this simple, there is no need for code-behind and it is not necessary to involve SOAP (Simple Object Access Protocol) (see figure 1 for the code).

There are a few things to note here. First, the ContentType of the page is set to text/xml (see screenshot 2). Without this, some browsers may not recognise it as XML, preventing the client-side parsing from working. Second, it is important not to have the client cache the page and show an old version of the current time. The call to SetCacheability should prevent this. Third, the code has a deliberate one-second pause, without which it returns so quickly that the demonstration is ineffective. Fourth, although this code is for ASP.Net, you could write similar code for PHP, Java or other server-side platforms. Here is the output:

```
<?xml version="1.0" ✔
encoding="utf-16"?><time ✔
current="hh:ss" />
```
(Key: ✔ code string continues)

Creating the Ajax client

The next step is to create a web page that calls this simple web service asynchronously. The following example works in IE 6, Firefox and Safari. In the HTML, there is a button to call the script and a <p> element to receive the output:

```
<p id="lbtime">
Click the button ✔
below...</p>
<p><input type="button" ✔
value="Click to get the ✔
time" onclick="getTime()"✔
></p>
```

Most of the action is in the script, which has to be written carefully to accommodate different browsers.

FIG 1

```
<%@ Page Language="vb" ContentType = "text/xml"%>
<%@ Import Namespace="System.Xml" %>
<Script runat="server">
Sub Page_Load
'insert a pause for the demo
System.Threading.Thread.Sleep(1000)
Response.Cache.SetCacheability(HttpCacheability.NoCache)
Dim xw As XmlTextWriter
xw = New XmlTextWriter(Response.Output)
xw.WriteStartDocument()
xw.WriteStartElement("time")
xw.WriteAttributeString("current", Now.ToShortTimeString())
xw.WriteEndElement()
xw.WriteEndDocument()
End Sub
</Script>
```
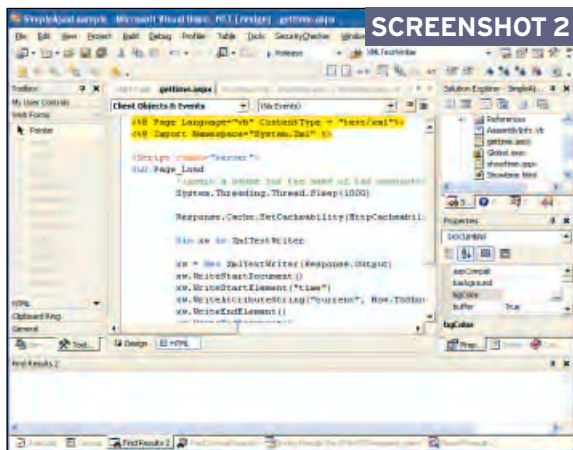
SCREENSHOT 2

Within the <script> element, there is a global variable for the XMLHttpRequest object:

```
var xmlhttp;
```

Next, the getTime function creates a new XMLHttpRequest object. In Firefox and Safari this object is built in, but in IE you create a new ActiveX object of type Microsoft.XMLHTTP. This object has an onreadystatechange property. If you set this to the name of a function in your script, it will be called whenever the readystate of the object changes. In this example, it is set to updateTime. The script continues by calling the object's open method, with the async argument set to true. This asks the XMLHttpRequest to retrieve the XML at the specified URL asynchronously.

The effect is like using a background thread. When you call send, the function returns immediately leaving the page updated with a Wait message.

```
function getTime() {
document.getElementById
("lbtime").innerHTML =
"Wait...";
if (typeof XMLHttp
Request != 'undefined') {
xmlhttp = new
XMLHttpRequest();
}
else {
xmlhttp = new
ActiveXObject("Microsoft.
XMLHTTP");
}
xmlhttp.onreadystate
change = updateTime;
xmlhttp.open("GET","http:
//yourserver/SimpleAjax
Example/GetTime.aspx",
true);
xmlhttp.send(null);
}
```

Next, the updateTime function gets called several times, but does nothing until the readyState is complete, represented by the value of 4. Then the responseXML property is set to an XMLDOM document built from the retrieved XML. You can parse this

Unlike most ASP.Net applications, this one uses standard HTML controls driven by client-side Javascript

using standard techniques, taking care to avoid browser-specific extensions.

```
function updateTime() {
if (xmlhttp.readyState
== 4) {
var xmlDoc =
xmlhttp.responseXML;
var nds =
xmlDoc.getElementsByTag
Name("time");
var nd = nds[0];
document.getElementById
("lbtime").innerHTML =
"Time now: " +
nd.attributes[0].
nodeValue;
xmlhttp = null;
}
}
```

More commonly, you would use XML for something more elaborate, such as a collection of items with which you can populate a list or table.

This application is online at **www.itwriting.com/pcw**. To use this technique in a real-world context you would need to add error-handling code and check more rigorously for incompatible browsers.

Pros and cons

Ajax has many of the advantages of rich-client applications while still being browser-based. It does not even require a plug-in such as Flash or Java. There are inherent problems – browser compatibility being the biggest. In addition, having to code extensive client-side Javascript is a step backwards for developers accustomed to clean object-oriented programming in Java or C#. An Ajax application requires more code, not less.

Some of these problems disappear if you have a library that generates the necessary Javascript. There are a number of these for platforms including PHP, .Net, Java and Ruby, and development is rapid. You can also use Ajax with Flash or Java applets.

Ajax reopens the debate about browser-based versus rich-client applications. With Ajax, the browser is the rich client, extending the number of applications you can manage without deploying a locally installed executable.

Jbuilder eclipsed

Borland's Java IDE is to be rebuilt on top of the open-source Eclipse tools platform. It is a turnaround for Borland as Eclipse was once the competition. Eclipse is free so it is a tough competitor, but the key issue is the level of third-party support it is attracting. IBM and BEA, who together command over half the market for Java application servers,

are strategic members of Eclipse, as is Computer Associates, making Eclipse the obvious choice for any company producing add-on tools. Borland will recreate Jbuilder as a set of extensions to Eclipse.

Another old-style version of Jbuilder, Jbuilder 2006, is expected later this year, and the first Eclipse-based version will follow in the first half of next year. Borland hopes to tempt existing Eclipse users to upgrade, but the main advantage is that the company can eventually base its collaboration and modelling products on a single IDE.

The transition may not be easy for Jbuilder users. The current Jbuilder IDE uses the Swing user interface framework, whereas Eclipse uses SWT (Standard Widget Toolkit), an alternative framework that wraps Java around widgets native to the operating system. You can build Swing applications with Eclipse, but the IDE itself is firmly based on SWT. Borland plans to maintain the features of Jbuilder on the new platform, but as Jon Harrison, European product line manager for Jbuilder, explained: 'Our intention in the longer term is to deliver equivalent functionality on this new platform, but I can't say that we will have that in the first version.'

One criticism of Eclipse is that, while SWT works well on Windows, it is not as good on other platforms such as Linux and Mac OSX. Some developers regard SWT as undermining the 'write once, run anywhere' philosophy that underpins Java. Sun is putting a lot of energy into its Netbeans IDE, which is also free in its basic version. Oracle also has a strong Java IDE called Jdeveloper and, although it is supporting Eclipse, it is not following Borland by abandoning its own offering. It is also worth mentioning Jetbrains IntelliJ IDEA, probably the best Java IDE for developers focused on code rather than visual designers. It is a shame to lose Jbuilder as an independent Java IDE, but there is still some healthy competition.

Mac Mini to the max

Chris Cain shows how you can add memory and install a new hard disk

Apple's Mac mini has been a big success, but its designers never intended the machine to be upgraded by end users. If you want to increase the memory or install a bigger hard disk, the official solution is to take your system along to an authorised Apple dealer.

But with care and the right tools you can replace these components yourself, saving time and money as well as boosting performance. Of course, we'd recommend this only to those who feel confident about the procedure – *PCW* cannot be held responsible for any damage you may cause to your system and you'll probably invalidate your warranty by opening the case.

Our guide is based around the standard Mac Mini configuration, without the optional Bluetooth and Airport components installed.

SCREENSHOT 1

Moving data to your new drive

If you want to transfer your existing applications, documents or even an entire system to your new drive, don't forget to back up your data to an external and preferably bootable device before upgrading. You can use Apple's Disk Utility to check the integrity of your current disk and to create an image of it.

Step 1

Opening your Mini and upgrading memory

The Mac Mini case doesn't have any screws, so you'll need to find another way to get the system open. Apple's own high-tech solution is simply to pry the system case apart using a modified putty knife.

To make your own Mini opener, take a very thin 1.5-2in putty knife and file down one side of the point with sandpaper until it becomes slightly bevelled.
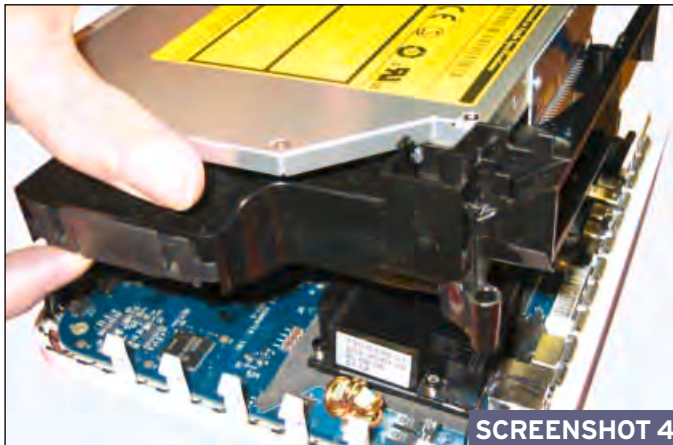
SCREENSHOT 4

SCREENSHOT 5

Step 4

Replacing the hard disk

Replacing the hard disk takes a little longer, but still requires nothing more than a set of screwdrivers and a steady hand. First, follow the steps above to remove the outer casing. Now, carefully remove the orange tape from the side of the internal frame to release the power cable. Put the tape in a safe place.

Using a jeweller's Philips screwdriver, remove the three small screws at the corners of the internal frame and set them aside. You should now be able to lift the frame (complete with the optical drive) straight up. Turn the frame over to reveal the hard drive.
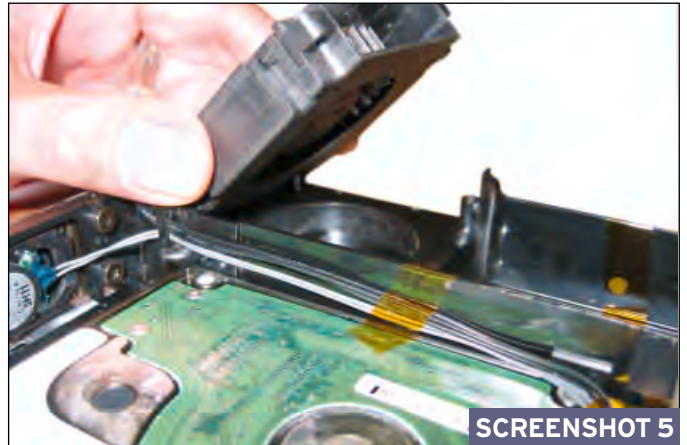
Step 5

The fan at the side of the frame covers one of the screws holding the hard drive in place. Undo the screws from the corners of the fan, store them safely and then flip the fan up out of the way. You can now remove the first screw on this side of the drive.

Getting to the second screw is a little trickier. Ideally, you'll need an angled jeweller's screwdriver but we managed it by holding one of the heads from a screwdriver with interchangeable blades between our fingers.

IMPORTANT NOTE
Do not remove the tape covering the hole at the side. This is placed specifically to direct airflow inside the machine.
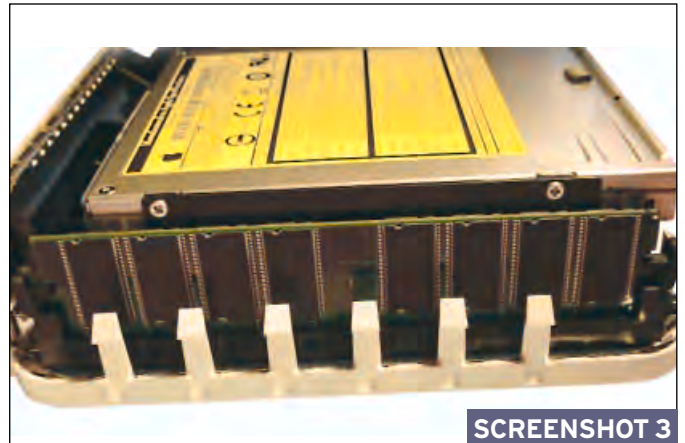
SCREENSHOT 2

SCREENSHOT 3

Step 2

Shut down your system and disconnect all leads, then place it upside down on a clean surface with the ports facing towards you. Touch the metal casing to discharge any static and put on an electro-static discharge (ESD) wrist strap if you have one.

Gently insert the putty knife into one side of the case (with the bevelled edge facing the bottom of the machine), between the metal surround and the plastic housing. The blade should slide in about half an inch. Now slowly ease the knife outwards to open the internal plastic latches and raise the side.

If you hear a horrible popping noise at this point, don't panic – this should be the sound of the latches releasing. Once the side is raised, repeat the procedure on the other side and remove the top cover by pushing the I/O panel upwards.

Step 3

You can now unclip the existing Dimm module and install a larger one. We replaced the stock memory with a 1GB DDR PC2700 module from Crucial Technology, at £74.01 inc VAT. Apple charges £150 before tax.

To reassemble the unit, turn the system upside down again and carefully align the I/O panel with the top housing. Make sure all the latches on the sides are also aligned. Now firmly push the two parts back together. If the two pieces don't snap shut, check that the metal tabs at the back aren't bent or in the way.
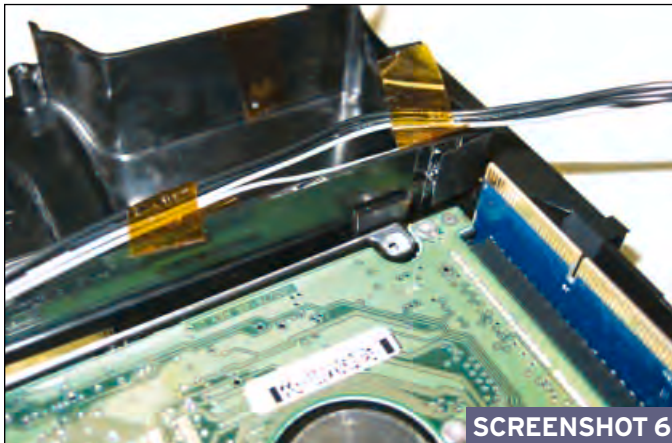
SCREENSHOT 6

SCREENSHOT 7

Step 6

Thankfully, the screws on the other side of the drive are much easier to deal with. Remove these and then unclip the fan and speaker cables on top of the drive (again, carefully lifting up the kapton tape).

You can now slide the drive away from its connector – you may need to use a non-conductive tool to pry it loose.

We upgraded the standard 2.5in 40GB drive to the excellent 100GB Seagate Momentus 5400.2 with 8MB cache, which costs around £130 inc VAT.

Reassemble the parts by reversing the procedure, taking care to replace all screws and tape.

Step 7

Finally, you'll need to format the drive and install Mac OSX to get your new and improved Mac Mini working. Simply reconnect all leads, switch on the machine, boot from your system CD and follow the instructions. Alternatively, you can boot from your external drive and then format the new one.

Leisure

LOADING...

Bullet proof

If you're a fan of rapper 50 Cent, Bulletproof could be the game for you. It depicts the hip-hop artist doing 'gangsta' things such as fighting, shooting and driving very fast. The story follows fictional events following 50 Cent's real-life shooting. It's up to you to help 'Fiddy' get revenge against his enemies – the most dangerous crime families in New York's drug underworld.

According to the game's official website (**www.the50centgame. com**), 50 Cent's vengeance leads him to uncover an international conspiracy, with devastating implications. 50 must fight his way out of a vicious web of corruption, double-crosses and shady deals.

The game is said to feature the image and vocal talents of the man himself, as well as Eminem and Dr Dre. Not much else is known, but expect Bulletproof to follow a similar path to the Grand Theft Auto games (see review, right). Any readers with a taste for hardcore rap music should check future issues of *PCW* for more information as it becomes available.

Grand Theft Auto: San Andreas

Enjoy gang warfare from the safety of your PC

RECOMMENDED
PERSONAL COMPUTER WORLD
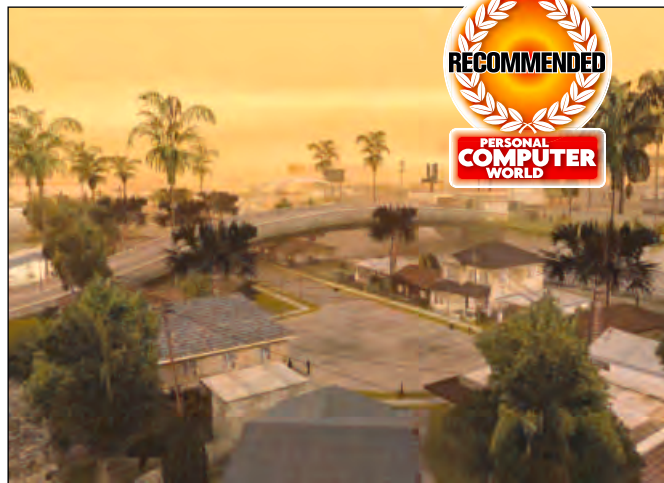
Eight months after its PS2 release, the latest installment in the Grand Theft Auto (GTA) series has finally reached the PC. Building on its two popular predecessors (GTA3 and Vice City), San Andreas is the most ambitious project to date, featuring a game world five times larger than that of Vice City. If guns, violence and bad language don't impress you, look away now.

Set in the early 1990s, the game revolves around Carl Johnson, a man whose family once ruled the fictional city of Los Santos. After hearing of his mother's murder, he returns to find his family in disarray. It's up to you to save them from falling apart while regaining control of the streets.

There are so many improvements over Vice City it's difficult to mention them all. As before, much of your time will be spent driving and developer Rockstar has worked hard to improve the already impressive in-car experience. In Vice City you could smash your way through traffic and expect other drivers to accept it. In San Andreas, it's a different matter. Dent the bodywork of a proud

Cleverly designed missions will keep you involved for hours

car owner and they'll chase you down the highway to get revenge. But this brings us to one of the few areas that disappoints – artificial intelligence. Drivers trying to chase you appear to have little sense – often slamming into walls simply because they have a bent fender. If they do catch up with you they offer little resistance to a beating.

Similarly, even when playing advanced missions, most enemies appear to have no knowledge or care for tactics. They'll simply charge at you, which makes it simple to pick them off from a distance.

San Andreas also lets itself down with some rather average graphics. There are no advanced 3D techniques to speak of, which is disappointing in a game with this much time and money invested in it. Textures are very basic and cut-scenes are played out by rather blocky characters.

This, in the main, is down to the GTA series being developed with the relatively sluggish PS2 in mind. Other aspects of its presentation are top notch though, with a star voiceover cast including Samuel L Jackson and James Woods, making amends for the poor graphics.

Although it has some minor niggles, San Andreas still deserves full marks. The cleverly designed missions and sheer enormity of the game ensures it will keep you amused for months on end.

Will Stapley

DETAILS

PRICE £34.99 inc VAT
CONTACT Rockstar
www.rockstar.com
SYSTEM REQUIREMENTS
1GHz processor • 256MB Ram •
3.6GB hard disk • 64MB graphics card
VERDICT
If guns and cars are your bag, San Andreas is a must
OVERALL ★★★★★

S.C.A.R
Racing and role playing in one game

Squadra Corse Alfa Romeo (S.C.A.R) is touted as the first 'CARPG' ever developed, as it combines fast-paced auto racing with elements you'd normally associate with role-playing games (RPG).

Whereas most games require you to upgrade parts of your car to improve performance, S.C.A.R uses a skill upgrade system that lets you improve nine different driver abilities across three levels of experience.

Skills include intimidation; the ability to scare other drivers into making mistakes; acceleration, which reduces the amount of time it takes to change gear; and endurance, the rate at which the condition of your driver regenerates.

The way that these skills are put into practice during a race is quite clever. As you hurtle around the track, you can reduce other racers' condition by putting pressure on them from behind. Hogging their bumpers gets them nervous and they are more likely to make mistakes.

When the tables are turned and drivers are on your tail, the screen goes temporarily blurry, which makes it more likely you'll get overtaken. Unusually for a racing game, S.C.A.R lets

you turn back time to correct mistakes, using what is known as the Tiger Effect.

Rating S.C.A.R is difficult, as it treads the line between an arcade-style racing game and a simulation (replete with role-playing elements). It does well to mesh all three aspects, but some gamers may prefer titles such as Gran Turismo, which concentrates and excels in one particular area. At times, it can seem as if the game is a jack of all trades, but a master of none.

While they don't always get it right, the makers of S.C.A.R have done a fantastic job in evolving the genre. If you want a fairly realistic racing game with compelling character-building aspects, this is definitely worth considering.

Rory Reid

DETAILS

PRICE £29.99 inc VAT
CONTACT Black Bean Games
www.blackbeangames.com
SYSTEM REQUIREMENTS
Win ME/XP or above • 256MB of Ram •
64MB graphics card with T&L • 2GHz
CPU • DirectX 8.1-compatible
soundcard • 1GB of hard disk space
VERDICT
**An original and fun racing game
that helps evolve the genre**
OVERALL ★★★★☆

Singles: Triple Trouble
Try your hand at virtual matchmaking

Singles: Triple Trouble is a voyeuristic simulation of virtual characters' love lives. The story follows Josh, a musician who relocates to a new city. On arriving, he moves into a flat with his new friend, Kim, only to find his ex-girlfriend Anna also lives there. It's up to you to decide whether Josh pursues a relationship with Kim or works things out with his old flame.

The game has a lot in common with The Sims 2. You'll need to pander to the basic needs of your singles, including their desires for friendship, romance, and eroticism. Keep them happy enough and they'll be more inclined to fall into bed together.

However, it's not always as straightforward as feeding your singles when they get hungry. Each has a unique personality and different expectations from a relationship.

You may find the target of your character's affections doesn't react well to certain types of stimulation (one may like to cuddle, and another may like to pillow fight), so a good deal of experimenting is required.

Should you get bored of Josh and his relationship dilemma, there is also a Freeplay mode

and 10 quests where you can pair five new characters.

This mode should appeal especially to fans of reality TV shows such as Big Brother, as playing matchmaker for the 17 characters on offer is an enjoyable challenge.

It's easy to pigeon-hole Triple Trouble as mindless titillation. However, it manages to stay appealing as you need to put a substantial amount of effort into making your singles have sex. Barring the 'self-pleasuring' option, you won't get much instant gratification.

It may not be quite as deep as The Sims games, but if you want a voyeuristic game with an adult theme, Triple Trouble fits the bill.

Rory Reid

DETAILS

PRICE £34.99 inc VAT
CONTACT Deep Silver
www.deepsilver.de
SYSTEM REQUIREMENTS
Win ME/XP or above • 256MB of Ram
• 64MB graphics card with T&L •
1.5GHz CPU • DirectX 8.1-compatible
soundcard • 1GB of hard disk space
VERDICT
**A surprisingly fun and adult-
oriented alternative to The Sims**
OVERALL ★★★☆☆

Xerox 9700

How one man fought and won the battle to make laser printing a reality

Launched in 1977, the Xerox 9700 was the first commercial laser printer.

The man who personally came up with the idea of laser printing was Gary Starkweather. He joined Xerox in July 1964 as an optical engineer on advanced copier technology.

His idea came while working with lasers as an alternative light source for high-speed facsimile systems. It dawned on him that, rather than scan and transmit someone else's document, you could generate one using a computer and send the electrical signals direct to the printer portion of the fax machine.

The idea was born, but Starkweather's management was less than impressed. The high cost of lasers at the time made them believe such a device could never be affordable. Starkweather was told to stop working on his laser printer concept, but he battled on, convinced falling prices would make it a viable option.

As this conflict came to a head in mid-1970, Xerox announced it was to build a new California-based lab to research digital technology. The Palo Alto Research Center (Parc) proved to be a dream come true for

Starkweather. He approached them and discovered the department researching personal computing technologies was wondering what they'd use for a printer. In January 1971, Starkweather and his family relocated to California.

Parc's management fully supported the idea for a laser printer. After Starkweather had equipped his lab, he was instructed to create a working laser printer for the Alto personal computer that was being developed in parallel.

Laser printing with tiny spots of light proved to be an ideal match for the Alto's bitmapped display. Printing with pixels was a natural way to convert such screen images to paper and lasers were the only light source capable of positioning the millions of points required to create a high-quality page in a second.

Starkweather was soon joined by Bob Kowalski, who helped turn his ideas into real working circuitry. Tibor Fisli later provided mechanical design and fabrication skills, while lab manager Bill Gunning was a source of encouragement.

One challenge was to find a way to deflect thousands of points of laser light hundreds of times a second with inexpensive

optics. The solution was to employ a rotating mirror with around 30 faces. As the mirror spun, each face deflected the laser across the photoconductor, while a special light modulator turned the beam on and off millions of times per second.

Starkweather's team adapted an existing Xerox 7000 reduction duplicator into the first working laser printer in just nine months. Designed for the Alto computer, it used low-cost Helium-Neon lasers, ran at 60 pages per minute and was called Slot – Scanning Laser Output Terminal. Once completed, Starkweather's team began researching a smaller, more personal laser printer and a colour model based on the Xerox 6500 copier.

In the meantime, a team lead by Jack Lewis with Tom Robinson and Ronald Rider developed Starkweather's prototype into a commercial laser printer. Eventually announced on 1 June 1977, the Xerox 9700 printer was based on the 9200 copier, ran at two pages per second, delivered a resolution of 300 dots per inch and was compatible with large IBM 360 systems. The standard model cost $325,000 (£182,000 approx), increasing to $500,000

for one with all the bells and whistles.

Xerox calculated each 9700 needed to generate about 300,000 pages per month in order for servicing and toner refills to be profitable. In reality, the average page count was over a million per month. Some businesses, such as Bank of America in Los Angeles, had 14 9700s running 24 hours a day with Xerox staff attending to their needs around the clock.

The 9700 and departmental laser printing made a fortune for Xerox, but it failed to see any profit in personal models. Despite Xerox scientists working on the idea, it was left to Canon to develop a cartridge toner system. This may have cost the owner more, but was easy to replace and generated a lot more profit. Canon's laser engine was subsequently employed by a new breed of personal laser printers, making companies like HP very rich. In the two decades following Starkweather's idea, personal laser printers spearheaded the DTP revolution and became standard equipment in almost every office – and the spinning mirror deflection system is still used to this day.

Gordon Laing
Thanks to Gary Starkweather

September
Cover Disc

Six pages of workshops, special offers and more »

On the CD

Spamcatcher 3.05

Travel Planner 2005 Great Britain & Europe

Testtrack Pro 7.11

CT Appointment+ PE

WORTH £235

On the DVD

Spamcatcher 3.05

Travel Planner 2005

Great Britain & Europe

Testtrack Pro 7.11

CT Appointment+ PE

Surround SCM 3.1.3

Fedora Core 4

WORTH £561

Using the cover disc

The *PCW* cover disc uses a web-browser-style interface. To get full functionality, you'll need to use Microsoft Internet Explorer (version 5.5 or later). Unfortunately, Netscape doesn't properly support this software. However, we have also provided links to the featured programs so that you can still copy them to your hard disk or install them manually (the standard download dialogue box will appear). Programs can be found in the \software\ folder on the disc.

Starting the disc

The CD-Rom (or DVD) should auto-start. If it doesn't, double-click the CD-Rom/DVD icon in My Computer, or open the terms.htm file on the root of the disc.

Problems?

Please note that we cannot give support on individual programs contained on this disc.
If you have problems running the disc or any of its content, please note these guidelines:
FAULTY DISC > If the disc is physically damaged and will not load, return it to this address for a replacement:
PCW September 2005 cover disc
ABT, 306 St Mary's Lane
Upminster, Essex RM14 3HL
quoting reference '*PCW* Vol 28 No 9'.
PROBLEMS INSTALLING/RUNNING THE SOFTWARE > Check the support page on the disc, or check the manufacturer's site.
GENERAL DIFFICULTIES > Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat). Or go to www.vnusupport.co.uk.
Or email us at pcw@vnusupport.co.uk.

SOFTWARE LISTING

CD
Full versions
Spamcatcher 3.05
Travel Planner 2005
Great Britain & Europe
Testtrack Pro 7.11
CT Appointment+ PE

Trial versions
DivX Create
Exact Image 7
Fotoslate 4
Spamcatcher 4

Build the ultimate PC ebook

From the magazine
Abyss Web Server X1 v2.0.6
Extendedpdf Open Edition

MySQL 4.0.24
PHP 5.04
Virtualdub MPEG-2
Vobedit

Freeware including
A43 File Management
Utility 2.45
Autoplay Repair 1.02
Autoruns 8
Baby Web Server 2.62
Coffeecup Free DHTML CSS
Tab Designer
DivX 6
Firetune 1.0.4
Freeproxy 3.81.1526
Gateway IP Monitor 1.21
Softcat 2.01

Resources including
Adobe Reader 7
Audacity 1.23
CD Burner XP 3.5.101.4
Cryptoexpert 2005 Lite 6.10
Cutepdf 2.3
Encrypted FTP 3.3.0.141
Faststone Image Viewer 2.12
HTMLGate FREE 12.2.1B
ICQ 5.04
Mozilla Firefox 1.04
Mozilla Thunderbird 1.02
Opera 8.01
Skype 1.3.0.51

DVD
Everything on the CD PLUS...

Full versions
Surround SCM 3.1.3

Trial versions
Adobe Illustrator CS2
Adobe Indesign CS2

Resources
Openoffice 2 Build 1.9.m109

Linux and open source
Fedora Core 4

Game demos

Spamcatcher 3.05

Keep your inbox free of spam

FULL VERSION

Need to know

System requirements
Windows 98 or later, Internet Explorer 5 or later, 15MB free hard disk space, Outlook 2000/2002/2003, Outlook Express, Eudora, Netscape, other email clients

Information
www.allume.com

Registration
Enter the magazine code PCWCAT3 at **www.allume.com/cgi-bin/freeallume. cgi?spam-pcwsept** to obtain your key via email

Limitations
None

If you still get too much junk mail no matter which spam filter you try, it's not surprising. On its own, even the best software isn't intelligent enough to reliably and consistently separate spam from regular mail. That's why Spamcatcher takes a very different approach.

Spamcatcher starts with the author's own servers, which track millions of email messages in real time, using this information to generate unique fingerprints for each one. If the same fingerprint shows up many times, Spamcatcher knows it's a message that's been sent in bulk.

Bulk messages aren't always spam, of course, so Spamcatcher also tracks the messages its users are rejecting as unwanted. If enough people mark the email as spam, the Spamcatcher Network will treat the message accordingly, and any future recipients will find it moved straight into the spam folder.

For this to work, the clients must send information about your email back to the company, but only the digital hash is transmitted so no-one will ever get to read your messages. See **www.allume.com/win/ spamcatcher/help-305/help_2a.html** on the author's site if you need more information.

If you're still concerned, you can also choose not to participate in the Spamcatcher network, in which case the program will use regular spam tools such as black and white lists instead. Either way, Spamcatcher will integrate neatly with Outlook, Outlook Express and most other email clients with the minimum of setup hassle, ensuring your inbox is protected within minutes of being Spamcatcher installed.

Optimising Spamcatcher for the best possible junk mail protection
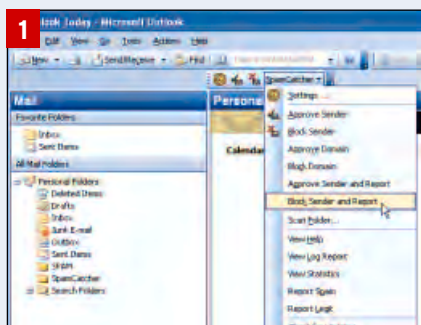
1 Spamcatcher will add new toolbar buttons to Outlook or Outlook Express. You can use these menus to tell the program which emails are spam, and it's less likely to let similar messages through next time. To start configuration click the Settings option.
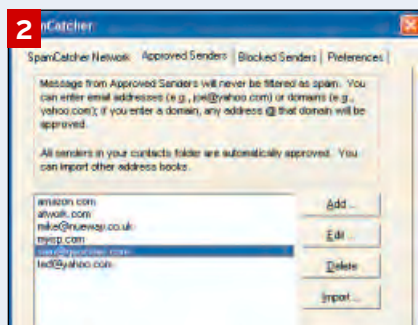
2 Spamcatcher goes to a lot of trouble to ensure it doesn't block legitimate emails, but there is a way to help. Add domains and email addresses that you trust never to send spam (use Import to read in your address book), and messages from them will never be filtered as spam.
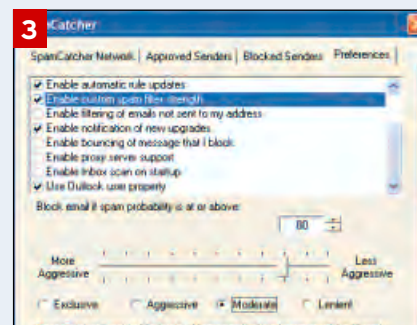
3 The program also lets you adjust the strength of its spam filter, although this option isn't enabled by default. To turn it on, click Preferences, check 'Enable custom spam filter strength', and adjust the slider to ensure the filter blocks even more spam.

Upgrade offer » Spamcatcher 4

SAVE £9 OFF RRP

New features
» Improved Outlook Express support
» Easier-to-use interface
» Anti-phishing features
» Checks for formatting tricks
» Checks source, content, and status of message with central database

The latest version of Spamcatcher has improved Outlook Express support, an easier-to-use interface and new anti-phishing features. It checks whether emails are using formatting tricks to bypass anti-spam rules, and checks the message's source, content, and to see if it's regarded as spam by the central Spamcatcher network database. The normal price is $29.99 (around £18) but as a Spamcatcher 3 user you can upgrade for just $14.99 (around £9), so point your browser at **www.allume.com** to find out more.

Travel Planner 2005

FULL VERSION

Find your way to any European destination

Frequent Eurotunnel trains and relaxed border controls mean it's never been easier to drive to your favourite European destination. Assuming you can find it, that is. That's where Travel Planner 2005 Great Britain & Europe comes in. Enter a starting point and where you want to go, and the program will plot the best route for you.

If you have more complicated requirements, there are plenty of ways for you to customise the route. If you're driving all the way across Europe, for instance, then you can add in other sites you'd like to see. Travel Planner 2005 Great Britain & Europe lets you include up to 22 intermediate points along your route and calculate a way to include them all.

It's also possible to choose the fastest or shortest route, or something between the two. You can get journey times that are even more accurate by building in details such as the petrol consumption of your car, so the program knows when you'll need to refuel. Or, if you have plenty of time, tell the route planner to include points of interest and tourist sites on the way.

If the cost of the journey is a factor, build in details such as the cost per mile, fuel price per gallon and so on. The program can then calculate the cost of the trip for you, which is handy if you're looking at a number of alternative routes. Factor in the maps and well-designed route plans and you have an ideal planner for any journey, whether you're travelling right across Europe or just staying within the UK.

Need to know

Single-CD edition

System requirements

Windows 98 or later, 128MB of Ram, ADO 2.5 or later, 480MB disk space

Information

www.mapandguide.com

Registration

Follow the instructions within the application

Three steps to your personalised European route

1 Perhaps the easiest way to enter your starting point and destination is directly from the map. One way to do this is to zoom in on an area, right-click on a place to select it, then choose a menu option to set that as your starting point, destination, or a point on the route.
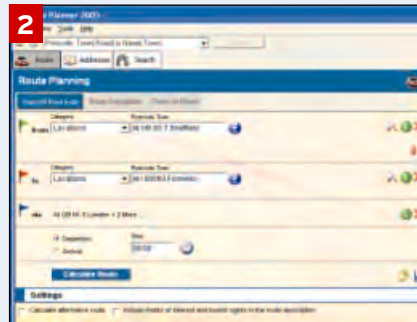
2 It's also possible to enter each point on your journey by typing the place names, but beware: you need to use the local spelling. For example, enter 'Roma' if you are visiting Rome. Use the green icon over on the right if you'd prefer to take the currently selected map location.
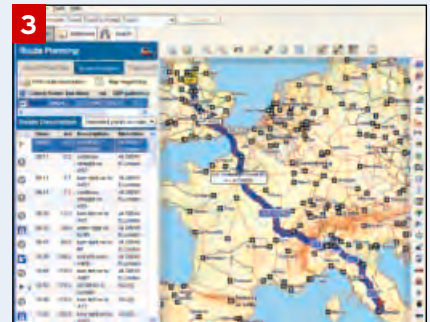
3 Click Further Settings if you haven't customised the program with details of the type of journey you want (shortest route or fastest and so on) then click Calculate Route. Finally click 'Print route description' to print a copy for easy reference on your journey.

Upgrade offer >> DVD edition

SAVE £5 OFF RRP

New features

» Zoom in on maps to house numbers

» GPS support

» Locate toll-free routes

The DVD edition of Travel Planner Europe 2005, from Map & Guide, enables you to do much more, such as zoom in to maps down to house numbers, and use GPS. Customise your holiday selecting various stop-off points, locate toll-free routes and more.

Instructions about upgrading to the DVD edition will be emailed to you after registration. Upgrade to the DVD edition for £24.99 (price includes shipping and VAT) and save £5 off the normal price. To order call free on 0800 289 041 and quote promotional code 502MGUPG.

Testtrack Pro 7.11

FULL VERSION

Don't drown in bug reports

Need to know

Single-user edition

System requirements
Windows 98, 128MB of Ram, 48MB disk space

Information
www.seapine.co.uk

Registration
Visit **www.seapine.com/pc-ttpro** to get your licence key

Limitations
Non-maintenance edition

No matter how much time you spend mastering software design methodologies, testing techniques and programming languages, your final applications will still contain bugs. It's inevitable, but don't despair: what's really important isn't the number of problems, but how you manage them.

Install Testtrack Pro and you'll have a powerful client/server solution that can track bugs, change requests, feature requests and more. The comprehensive database covers all the details you need to know; bug description, steps to reproduce, test configuration, associated links, bug history and more. You can attach source code or other files to a record for review later, and produce a variety of reports to help you manage the largest of projects.

Testtrack Pro is likely to fit in with your applications. It integrates with all the main source code control tools, including Microsoft Visual Sourcesafe, Clearcase, Perforce, CVS, PVCS, Starteam, CS-RCS and Sourceoffsite Classic. (If you don't have those, try Seapine's Surround SCM, which, if you've bought the DVD edition of *PCW*, you'll find on the cover disc). An add-in lets you use Testtrack Pro from within Visual Studio .Net or Visual Basic 6.

It's easy to adapt the program to your needs. You can customise field values, labels and relationships in the defect database, and adapt the issue workflow to ensure it follows your business process. And it's fully extensible, with the optional SOAP-based SDK (although that's not included here), open database support via ODBC and support for Oracle and Microsoft SQL Server databases.
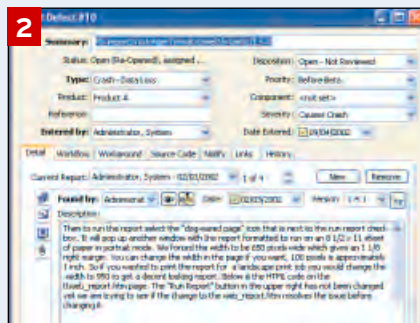
Easily record, manage and report on all your software issues

1 Testtrack Pro comes with a built-in sample project, ideal for a quick look at exactly what the program has on offer. You start with a view of your current software defects, which can be filtered to show only particular issues ('high priority', 'open this month' and so on).

2 Double-click on any defect to view more details about it. Here you can find out the bug type, who discovered it, any steps necessary to reproduce the problem, and more. Click Tools > Configure List Values if you'd like to edit the 'Defect type' descriptions, say, to add your own.
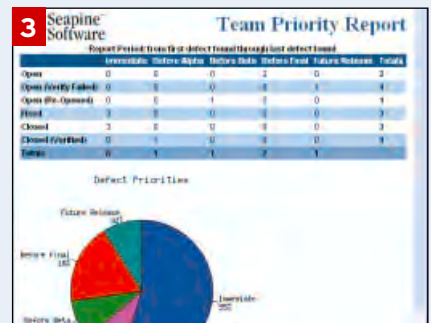
3 Use the Reports to get an overview of your current project status. Click View > Reports, then 'Team Update, Priority' and select Preview to see how many high-priority issues are left to be fixed. Then play around with a few custom reports of your own (Create > Report...).

Upgrade offer >> Multi-user licence

New features
» Provide a copy of Testtrack Pro to all your development team and testers

We're giving away the full and latest version of Testtrack Pro, but it's licensed for one user (ideal for a single programmer), so if you want all your development team and testers to have a copy then you'll need to upgrade. *PCW* readers can find the cost of upgrading to a multi-user licence by heading to **www.seapine.com/pc-ttpro**.

CT Appointment + PE

FULL VERSION
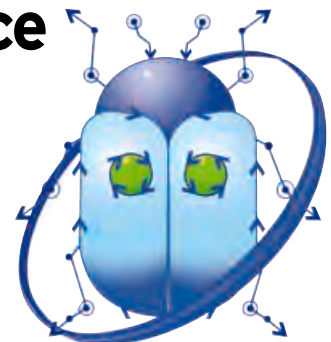
A powerful time-management tool

At first glance, CT Appointment + Personal Edition looks like a scheduler – another way to arrange and organise your day. There's a six-month mini-calendar at the top of the screen, multiple views of the next few weeks (day, week, month) and a timeline view of upcoming appointments. The timeline will be empty when you start, but by double-clicking on a time slot you can fill in details of whatever you should be doing at that moment.

There's more to the program than you might think, though, and the first clue is over on the left-hand Resources tab. Double-click on one of the default entries for the author's staff and you'll find it's also a handy contact manager with some useful extra touches. There's a 'Map' button next to the

Postcode entry, for instance, which shows you a map of that location at Multimap.com. And, of course, you can customise it further by adding details of your own friends and colleagues. However, you still wouldn't be getting the most out of the program.

CT Appointment + also enables you to manage and schedule other resources, such as equipment, vehicles, locations, or anything else your business might use. Create a resource record for the projector, the pool car or the meeting room, and you can check their schedule as required and allocate them to appointments when available. It's a powerful business tool, so make sure you browse the documentation to find out more (normally at program files\Client Technologies\CT Appointment Plus\Docs).
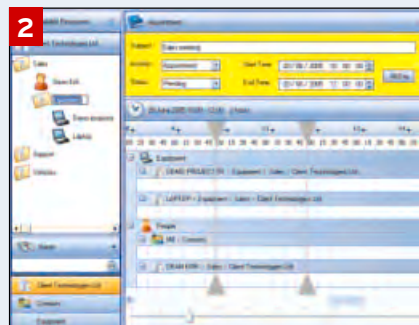
Take control of all your business resources in three easy steps
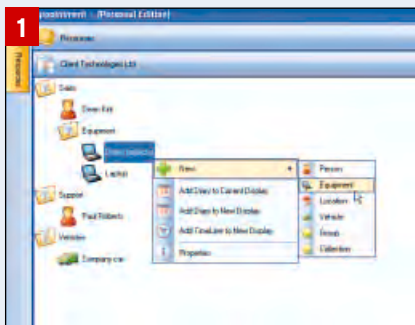
1 To configure CT Appointment +, tell it about your company resources. Click the left-hand side Resources tab, then right-click in the Client Technologies window and select New > Person, or Equipment, or Vehicle or whatever you'd like to add (choose Group for a new folder).

2 Now switch back to the Calendar and play around with the different views until you've found a date where you'd like to add an appointment. Double-click that time slot, give the appointment a Subject and time range, then drag and drop in any resources you need to use and click Save.
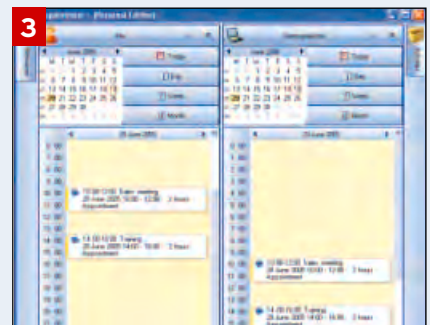
3 If you want to review your appointments later, click on any day marked as bold in the monthly calendar to remind yourself of the details. You can also drag in one or more resources to see how their time has been allocated, to avoid conflicts and optimise the use of your kit.

Upgrade offer >> Professional edition

New features

- » Check for conflicts when you're scheduling resources
- » Appointment reminders via email
- » Comprehensive reports
- » Import/export features
- » Integration with Excel, Outlook or Access

If you need more scheduling power, CT Appointment + Professional will check for conflicts when you're scheduling resources, for instance, and can send appointment reminders via email. There are comprehensive reports, import/export features, integration with Excel, Outlook

or Access, and more. By the time you've started using CT Appointment+ Personal, the Professional edition will have been released. Better still, Clienttec will offer readers a special upgrade price. To find out more, head to www.clienttec.co.uk/register.

Surround SCM 3.1.3

ON OUR COVER DVD

**FULL VERSION**

Control and record changes to source code

It's a fundamental law of software development that no program is ever really finished. There are always optimisations to be made and bugs to be fixed, and if you spot one in the source code then it's tempting to make an instant tweak. But what if your fix doesn't work, or it breaks another part of the application? If you can't undo the changes, you'll be in trouble.

Surround SCM is a change management utility designed to solve these problems (and many others). Check out source code modules when they need updating, and the program records it. Make your changes, check the modules back in, and the changes are recorded for posterity. Now you can easily view the source code modifications you've made over time and revert to a previous version if your fix doesn't work out.

This could all have involved a lot of extra work, but Surround SCM minimises any hassle by integrating with popular development tools such as Visual Studio, Jbuilder, Eclipse, Websphere, Codewarrior, Dreamweaver and others. Once installed and set up, just open .Net (for instance) and you'll find a new toolbar providing speedy access to all Surround SCM features.

The program isn't restricted to dealing with source code, either – it's an ideal tool for managing the digital assets of any project, including requirements documents, web pages, image files, specifications, project documentation and more. It even integrates with the Seapine defect management tool Testtrack Pro (also on this month's cover disc), and together they form an ideal way to manage your next software development.

Take control of your Visual Studio .Net source code
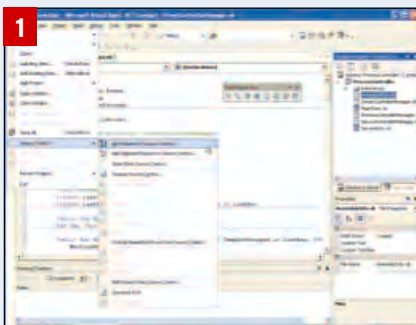
1 Once you've installed and set up Surround SCM (read the bundled documentation for guidance), using it within Visual Studio .Net is quite simple. To begin, open the solution you'd like to monitor, then click File > Source Control > Add Solution to Source Control.
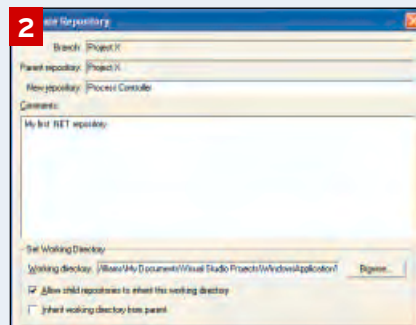
2 After you've created a main project branch in the SCM client, you'll probably be prompted to 'determine a repository association' for your source code files. Click Fix > Create Repository, give it a name relating to this project, then click OK > OK to add the files to SCM.
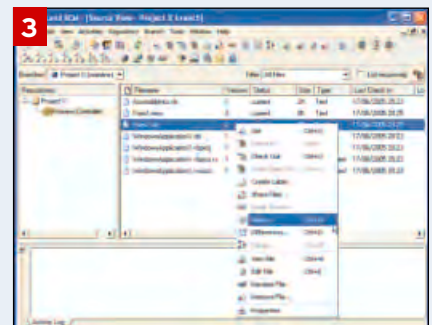
3 Make any changes you like and check the files back in (try right-clicking in the Solution Explorer). Repeat the process and Surround SCM records the changes each time. Open the client to view your project, right-click on a file and choose History to recall an earlier version.

Upgrade offer »» Multi-user licence

New features
» Source code management for a team of developers

Most developers work within a multi-user environment, so that when people make changes, you'll need a framework to check for errors. Source code management is made top priority when you have a team of developers, but our version comes with a single-user, non-maintenance licence (ideal for a single programmer who won't need further support), so to get the most out of it you'll need to upgrade. Details of multi-user upgrades will be made available after registration, by heading to www.seapine.com/pc-sscm.

SEPTEMBER 1985

Quite why Charlie Chaplin appeared on the front of the September 1985 issue is anyone's guess, but there he was, proudly standing over the brand new Apricot F10 – ACT's latest home computer. Our very own Peter Bright was given the task of inspecting the new Apricot and, on opening the rather flimsy casing, discovered it was running off the very same Intel 8086 chip (with a clock speed of 4.7MHz) that featured in ACT's previous Apricot system, the F1. One significant change was the amount of Ram. ACT had doubled it from 256KB to 512KB while adding a 10MB hard disk drive. ACT hadn't skimped on the monitor either. The Sony FD

Trinitron screen had four colours and performed extremely well. With a price tag of £2,295, the Apricot F10 was a quality effort from ACT.

Meanwhile, the eighth *Personal Computer World* show was kicking off in London. All the big names were present, including Amstrad, Acorn, BBC and Sinclair. Atari showed off its new 520ST, which was not only a gaming computer, but also a competent business machine. It went on to take the home computer market by storm.

SEPTEMBER 1990

PCW's Guy Swarbrick proclaimed: 'The PC industry is, without doubt, going through one of its slow periods. Strangely, though, while there is little new hardware or software around, what there is is innovative.'

One of the innovations he was talking about in September 1990 was the Agilis System. Guy described it as 'a rugged, flexible, portable PC quite unlike anything else on the market'. This was a machine that could be tailored to suit your needs. It included features such as packet radio capabilities and a portable handheld computer that could communicate with the main PC via an Ethernet network.

In Westminster, Emma Nicholson MP was concerned about the

ACT's Apricot F10 cost £2,295, for which you got double the Ram (512KB) of the F1

criminal world and its involvement with PCs. Far from being your standard politician, Nicholson had spent 18 years of her life as a computer programmer and was well qualified to talk on the subject. *PCW* asked her about the impending Computer Misuse Act that was designed to put a stop to those using PCs to aid criminal activities. According to Nicholson, abusers of electronic data should be punished heavily for their actions. With viruses, spyware and other malicious programs flying around the net like never before, the Computer Misuse Act appears to have had little effect.

SEPTEMBER 1995

'The Truth' about the newly launched Windows 95 operating system was boldly declared on our September 1995 cover. Inside, a huge 36-page review bared all, as the *PCW* team attempted to separate Windows fact from fiction. The operating system was compared to floor wax and dessert topping, among other things, as we tried to explain its new functions.

While our overall impressions were positive, not everyone was convinced that Windows 95 was the future. Jez Deacon, technical director at Carrera, told *PCW* it would probably be 'an optional purchase initially'. He continued: 'We'll gauge the reports and customer reception when we decide whether to make it the initial product on all systems.' Hindsight is a wonderful thing.

As the launch of Playstation 3 approaches, it may come as a surprise to some readers that the September 1995 issue marked the five-year anniversary of the original Playstation console. Chris Cain reviewed it, along with the Sega Saturn, and concluded that the Playstation outclassed the Saturn in terms of hardware design, although he said the Saturn may win the competition initially, because of its superior game titles.

As the venerable Mr Cain concluded, however, 'This is an issue Sony can do something about and, once it does, Sega will have a big problem.' Never was a truer word spoken. We rounded off the issue with a review of the Pentium 90, which powered 21 PCs in a massive group test – the Adams Accura Professional 586 earned top honours.

SEPTEMBER 2000

Our September 2000 issue invited readers to become scanner experts through our 16-page *PCW* Expert section. Here, we talked you through the history of scanners, the technology behind them and how to get the best from your pictures. Fascinating as the subject was, we fear readers may have been distracted by a Magix Music Maker ad. A young couple in the throes of passion were used to deliver a message about making love songs with Magix software. Imaginative if rather tenuous.

We continued the theme of finding the perfect image quality by looking at 13 of the latest 17in CRT monitors. The 19in TFTs featured in our group test this month (see page 97) were little more than a pipe dream in 2000, but excellent submissions from Hansol, Sony and Iiyama were more than up to the task of playing games, movies and everyday desktop use.

Elsewhere, Barry Fox blew the lid off NTT Docomo's I-Mode mobile service, which could handle HTML at a relatively high speed. Mobile users had been disappointed with the recently introduced and over-hyped Wap service, so I-Mode offered a viable alternative. Indeed, I-Mode is still going strong and there are plans to introduce it to the UK later this year.

Finally, DAB (Digital Audio Broadcasting) was starting to make waves in the radio market. Early DAB receivers were appearing, but it was early days in terms of how manufacturers would make use of what DAB had to offer. Five years on and the full capabilities of DAB still haven't been realised.

The *PCW* team